COLOR IMAGE SCANNER

CS300/400 SERIES

SERVICE MANUAL

CS300/400-UM251-04-9370

GRAPHTEC

HISTORY OF REVISIONS

No.	Date issued	Description of revision	Page	Edition
1	04.04.16	First Printing	All	01
2	04.07.04	Part number for the paper hold-down plate corrected	6-1	02
3	05.01.06	Firmware update procedure corrected	9-8	03
4	05.01.14	Part number for the contact glass 3 mm corrected	6-1	04

CONTENTS

1. OVERVIEW 1-1
   1.1 Features 1-1
   1.2 Standard Specifications 1-2
   1.3 External View 1-3
2. PART NAMES AND FUNCTIONS 2-1
   2.1 Part Names and Functions 2-1
3. PREPARING TO OPERATE THE SCANNER 3-1
   3.1 System Requirements 3-1
   3.2 Connecting the Scanner to a Power Supply 3-2
   3.3 Connecting the Scanner to a Computer 3-4
   3.4 Making the Document Hold-Down Unit Force Settings 3-6
4. INSTALLING THE SOFTWARE 4-1
   4.5 Installing the Scanning Master 21+ Application 4-8
5. DAILY MAINTENANCE 5-1
   5.1 Opening and Closing the Top Cover 5-1
   5.2 Cleaning the Document Hold-Down Unit 5-2
   5.3 Cleaning the Image Sensors 5-3
   5.4 Cleaning the Paper Sensors 5-4
   5.5 Removing a Jammed Document 5-5
   5.6 Calibration 5-6
6. RECOMMENDED PARTS LIST 6-1
7. LIST OF JIGS AND TOOLS 7-1
   7.1 Jigs 7-1
   7.2 Tools 7-1
   7.3 Other 7-1
8. DISASSEMBLING AND ADJUSTING THE MECHANICAL PARTS 8-1
   8.1 Right Side Cover 8-1
   8.2 Left Side Cover 8-1
   8.3 Center Cover Assembly 8-2
   8.4 Front Guide Assembly 8-2
   8.5 Rear Cover 8-3
   8.6 CIS Unit 8-4
   8.7 Motor 8-5
   8.8 Drive Roller Pulley 8-6
   8.9 Drive Rollers 8-7
   8.10 Drive Belt 8-8
   8.11 Center Cover Sensor 8-9

8.12 Front and Rear Paper Detection Sensors 8-10
8.13 Control Panel Sheet Switch 8-11
8.14 Contact Glass Assembly 8-12
8.15 CIS (Charge Coupled Device Imaging Sensor) Assembly 8-13
8.16 CIS (Charge Coupled Device Imaging Sensor) Board 8-14
8.17 Document Hold-down Plate 8-15
8.18 Pinch Roller Units 8-17
8.19 IEEE 1394 Board 8-19
8.20 Data Controller Board 8-20
8.21 Data Power Board 8-22
8.22 CIS Power Board 8-23
8.23 Switching Power Supply Board 8-24
9. BOARDS AND ELECTRICAL COMPONENTS 9-1
9.1 Wiring Diagrams 9-1
9.2 Replacing the Data Controller Board 9-6
1. Precautions for replacing the data controller board 9-6
2. Replacing the data controller board 9-6
9.3 Replacing the IEEE 1394 Board 9-7
Input the MAC address to the IEEE 1394 board 9-7
9.4 Downloading Firmware 9-8
1. Items required to download firmware 9-8
2. Procedure 9-8
10. ADJUSTMENTS USING THE SOFTWARE 10-1
10.1 Starting the Software 10-1
10.2 Preparations before Making Adjustments 10-3
10.3 Preparing a Test Chart 10-4
10.4 Making Adjustments 10-5
Scanner Calibration 10-5
1. Calibration (white correction) 10-5
2. Feed distance adjustment 10-7
3. Position adjustment 10-9
4. Color correction (using a color correction sheet) 10-15
11. TROUBLESHOOTING 11-1
12. SCHEMATIC DIAGRAMS 12-1
12.1 Data Controller Board 12-1
12.2 CIS Controller Board 12-16
12.3 Data Power Board 12-20
12.4 CIS Power Board 12-22
12.5 Relay Board 12-23

12.6 IEEE 1394a Board 12-24
13. OPTION 13-1
13.1 Optional Items 13-1
13.2 Consumables 13-1
14. PARTS LIST 14-1
14.1 Outer Casing 14-1
14.2 Main Frame 14-2
14.3 Front Guide 14-4
14.4 Drive Roller 14-6
14.5 CIS Unit 14-8
14.6 Center Cover 14-10
14.7 Hold-down Unit 14-12
14.8 Cables 14-14
14.9 Other Parts 14-14

1. OVERVIEW

1.1 Features

- **600-dpi optical resolution for high-precision image scanning**
  Scanning with an optical resolution of 600 dpi allows even complex and difficult-to-scan documents, such as CAD drawings, electronic files, and mapping data to be scanned rapidly and with high precision. Scanning Master 21+ (scanner software included as a standard accessory) can be used to adjust the resolution in five levels (50 dpi to 800 dpi, in 1-dpi increments) to suit the scanned document.
- **Compatible document widths range from 210 mm to 1016 mm**
  Compatible with document sizes from ISO A4 up to ANSI E
- **Capable of color and grayscale scanning**
  Capable of scanning in color (24-bit color*, 8-bit color) or grayscale (256 shades)
  * CS400 only
- **Capable of reading long-axis data**
  Scanning of long-axis images is supported.
- **Compact and lightweight design**
  A compact design was achieved by using a document travel system that employs contact image sensors in the sensor unit (five rows arranged in a zigzag pattern).
- **Image-processing functions**
  Use of the scanning software provided lets you set image-processing functions for the scanning of a document.
- **Interface**
  USB 2.0, IEEE 1394

1.2 Standard Specifications

Item	CS400	CS400
Document size	ANSI E to ISO A4 Maximum width: 1090 mm; minimum width: 210 mm	
Effective scanning area	Width : 1016 mm (centered) Length : 16 m*1	
Guaranteed scanning precision range*3	841 mm x 1189 mm	
Document thickness	1.5 mm or less (including the carrier sheet)	
Optical resolution	600 dpi	
Interpolated resolution	50 to 800 dpi, in 1-dpi increments	
Main scanning system	Contact image sensor system (Five A4 sensors in a zigzag pattern)	
Sub scanning system	Document travel (sheet through) system	
Scanning speed*2	Monochrome: Approx. 0.55 ms/line 9 inch/s at 400 dpi Color: Approx. 1.65 ms/line 3 inch/s at 400 dpi	
Scanning precision*3	±0.1%, ±5 pixels	
Gradation	Monochrome: Bilevel, intermediate tones (dithering, error diffusion) Gray : 256 shades	
	Color: 8-bit, 24-bit	8-bit
Threshold value	Digital signal processor enable automatic setting of the threshold value (monochrome scans only)	
Color space	sRGB compatible	
Light source	LED (RGB)	
Interface*3	USB 2.0, IEEE 1394	
Output	Image data	
Rated power supply	100 to 120/200 to 240 VAC ±10%, 50/60 Hz	
Operating environment	Temperature: 10˚C to 35˚C Humidity: 35% to 80% RH (no condensation)	
Power consumption	135 VA or less (60 W or less)	
External dimensions (approx.)	1205 X 957 X 715 mm (WXHXD) (including stand)	
Weight	Approx. 40 kg (including stand)	

* 1 Documents up to approximately 16 m in length (driver software limitation) can be scanned. However, the actual document length that can be scanned is limited by the available memory (hard disk or other data storage device) of the computer to which the scanner is connected, and also by the grade of the medium being scanned.

* 2 Excluding data-transfer time

* 3 Notes on scanning precision

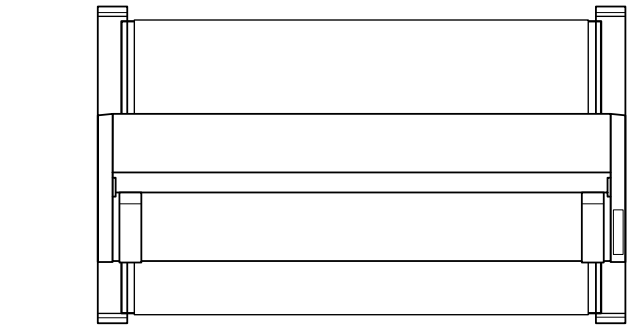
Scanning precision may vary slightly depending on the grade and thickness of the medium being scanned, and on the operating conditions. The precision figures above were measured under the operating conditions described below.

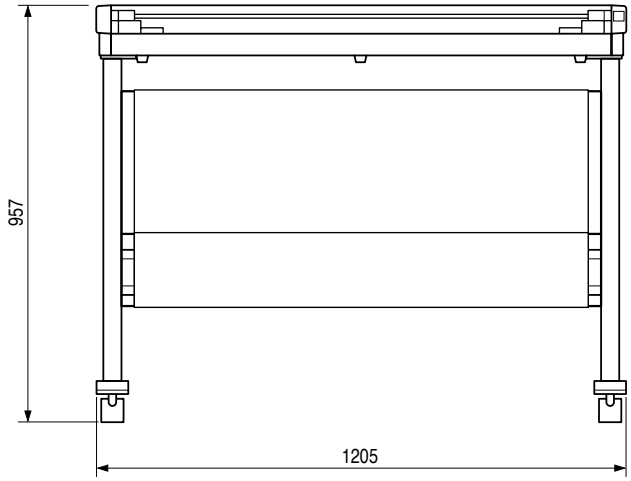
- Test chart used : Mylar sheet #200
- Guaranteed precision conditions : Temperature 20 ±3˚C; humidity: 60% ±10% RH
- Document hold-down unit setting : Standard

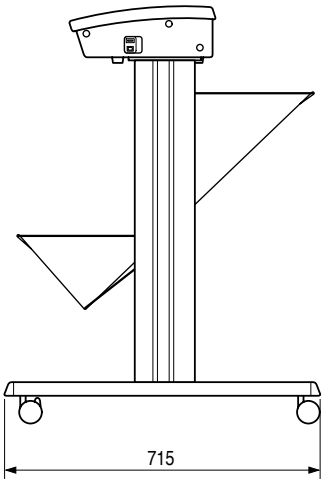
* 4 The USB 2.0 and IEEE 1394 interface cannot be used at the same time.

1.3 External View

External Dimensions







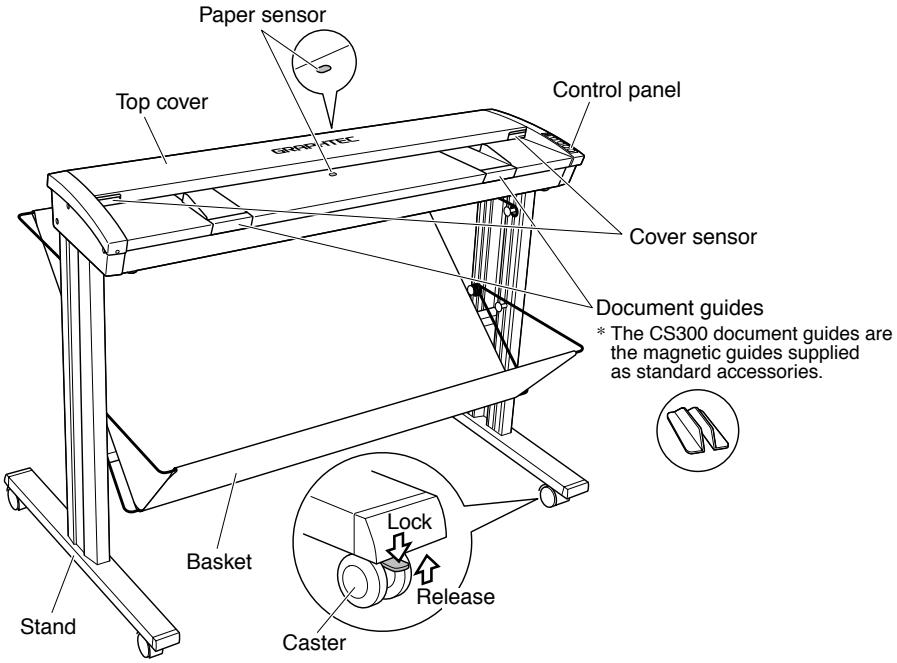
Unit : mm
Dimensional precision error : ±5 mm

Note: The diagrams are of the CS400 model.

2. PART NAMES AND FUNCTIONS

2.1 Part Names and Functions

Front View



Top cover

Open the top cover to clean the document hold-down unit and transparent contact plates.

Paper sensors

These sense whether a document is present in the scanner.

Cover sensor

This senses whether the top cover is open or closed, and interrupts scanner operation if the top cover is opened during operation.

Document guides

Use these guides to determine the position of a document when you load the document.
These guides are a sliding type for the CS400 and a magnetic type for the CS300.

Control panel

Use the keys to operate the scanner and the LEDs to monitor the operating status.

Stand

The stand unit is assembled for mounting of the scanner unit.

Basket

Receives the document that has been scanned.

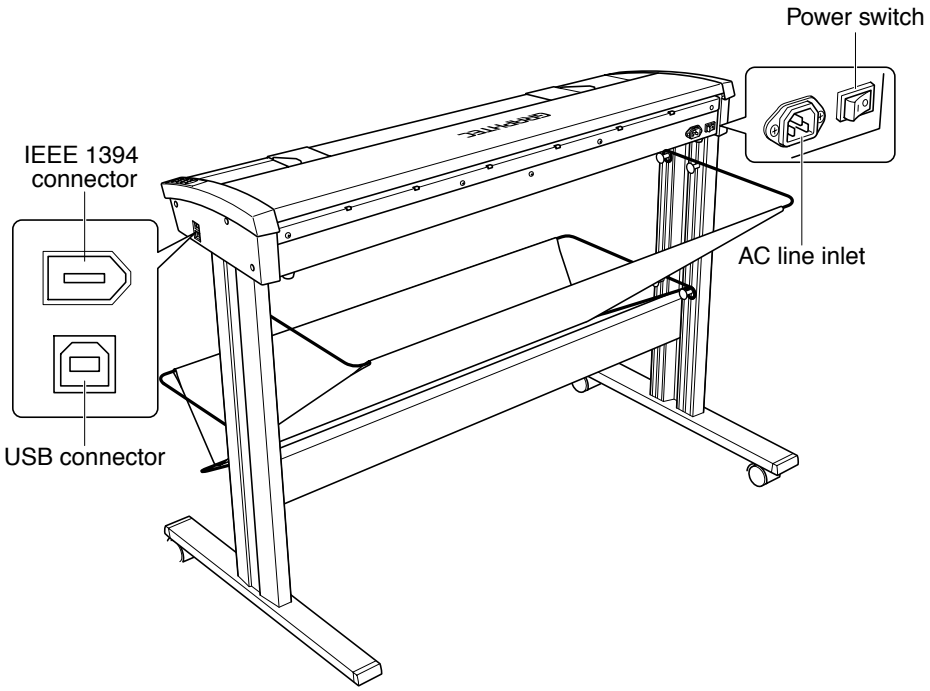
Casters

Release the lock on the casters to allow the unit to be moved.

⚠CAUTION

Do not touch the cover sensor or paper sensor.

Front View



Power switch

Controls the on/off status of the power supply to the scanner.

AC line inlet

Connect the power cord's female plug here.

USB connector

Used to connect the USB interface cable.

IEEE 1394 connector

⚠CAUTION

The USB and IEEE 1394 connectors cannot be used at the same time. Do not connect both the USB and IEEE 1394 cables to a computer, or to two separate computers, at the same time.

Control panel

POWER LED

Unlit : Is unlit while the scanner is turned off.
Lit (green) : Lights when the scanner is turned and remains lit while it is operating normally.
Flashing (orange) : Flashes when the scanner is in power-saving mode.

PAPER LED

Unlit : Normal status (Local status).
Lit (green) : Lights when the scanner enters Scan READY status.
Flashing (green) : Flashes while image data is being scanned.

ERROR LED

Lit (red) : Lights to indicate a hardware error.
Flashing (red) : Flashes when a document is detected during the selftest when the scanner is turned on; when scanning is suspended by pressing the STOP key; when a paper jam is detected; or when the document length is shorter than the specified scan length.*
Unlit : Normal status
(* When "Confirm" has been selected for the End-of-paper Processing setting in the Scanning Master 21+ driver.)

SCAN key

This key enables you to scan a document according to the settings of Scanning Master 21+ when the scanner is connected to a computer.
Start up Scanning Master 21+ before scanning a document if it is not already active.

FORWARD key

Advances the document into the scanner. When this key is pressed in Scan READY status, the Scan READY status is cancelled and the document is ejected toward the rear of the scanner.

REVERSE key

Feeds the document toward you. When this key is pressed in Scan READY status, the Scan READY status is cancelled and the document is ejected toward the front of the scanner.

STOP key

Compulsorily stops scanning of the document.

3. PREPARING TO OPERATE THE SCANNER

3.1 System Requirements

The minimum system requirements for running the scanner's hardware and software are listed below.

- ◆ Operating system: Windows 2000 Professional/XP Professional/9XP Home Edition
- ◆ CPU: Pentium III/4
- ◆ Memory: 32 MB or more
- ◆ Monitor: 1024 × 768 pixels, 256 colors or more
- ◆ Enough disk space to store data
- ◆ Mouse
- ◆ USB 2.0 interface*1 (that comes standard with your computer) or IEEE 1394 interface*2

*1 If your scanner does not operate with the USB interface that comes with your computer, or if your computer does not have a USB 2.0 interface, please contact your sales representative or nearest Graphtec vendor for information on supported add-on cards.

*2 Graphtec does not guarantee correct scanner operation with every IEEE 1394 computer interface or add-on card. Please contact your sales representative or nearest Graphtec vendor for information on supported add-on cards.

Recommended environment

For binary monochrome data

- ◆ CPU: Pentium 200 MHz or higher
- ◆ Memory: 64 MB or more
- ◆ USB 2.0 interface (that comes standard with your computer)

For grayscale data

- ◆ CPU: Pentium III 550 MHz or higher
- ◆ Memory: 256 MB or more
- ◆ Monitor: 1024 × 768 pixels, High Color or higher resolution
- ◆ USB 2.0 interface (that comes standard with your computer)

For 8-bit/24-bit color data

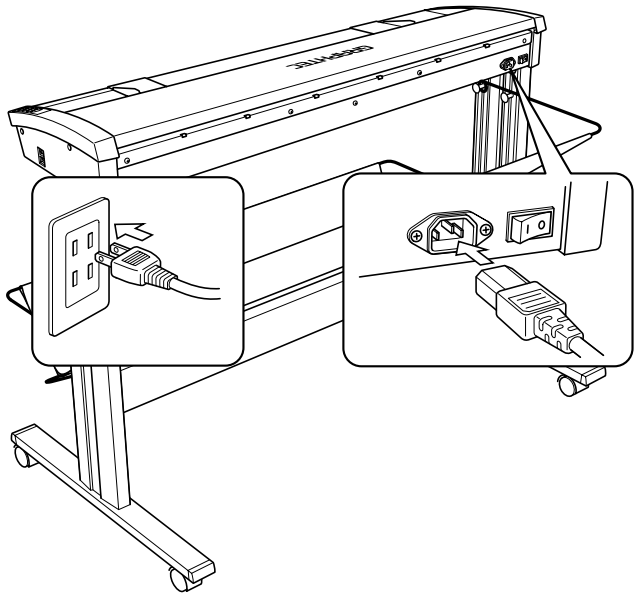
- ◆ CPU: Pentium 4
- ◆ Memory: 512 MB or more
- ◆ Monitor: 1024 × 768 pixels, True Color or higher
- ◆ USB 2.0 interface (that comes standard with your computer)

CHECKPOINT

The system configuration should correspond to the recommended specifications listed here, in order to ensure the optimum capabilities of the scanner.
Use with a system configuration below the recommended specifications will affect the scanning speed and prevent the scanner from operating to its specified capabilities.
To edit an A1-size or larger grayscale document with a resolution of 400 dpi or higher, or color document, you may need more than the recommended memory sizes above. Depending on the type of document, you may not be able to scan in the document even if you increase the memory size.

3.2 Connecting the Scanner to a Power Supply

Insert the female plug of the power cord provided into the scanner's AC line inlet and insert its male plug into an electrical socket supplying AC voltage.
Check that the scanner's Power switch remains in the Off position until the connection of the power cord has been completed.



CHECKPOINT

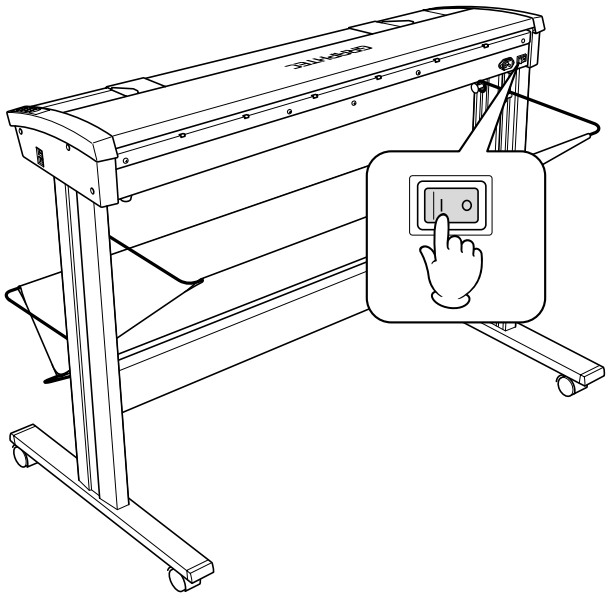
Ensure that the scanner's Power switch is in the Off position.

⚠CAUTION

Make sure that your scanner is properly grounded. If it is not grounded, there is a possibility that noise will cause incorrect operation, or that the scanned image may be distorted.

Turning the Scanner On or Off

Whenever the scanner's Power switch is turned on, the POWER, PAPER, and ERROR lamps on the control panel light up. When the scanner has been initialized, the POWER lamp lights up.



CHECKPOINT

When resetting the scanner by turning it off then back on again, wait at least five seconds before turning it back on.

3.3 Connecting the Scanner to a Computer

The scanner can be connected to a computer using the USB interface or IEEE 1394 interface.

⚠CAUTION

The operation of the scanner cannot be guaranteed in the following cases:

- When the cable is connected to a USB hub or an add-on USB board.
- When you are using a custom-built computer or one that you have modified.

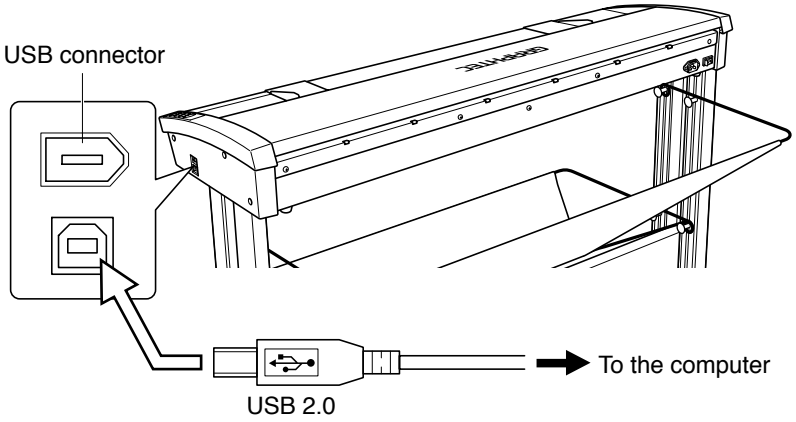
The following should never be attempted:

- Remove or reinsert the cable while you are installing the driver.
- Remove or reinsert the cable while starting up the computer or the scanner.
- Remove or reinsert the cable within a period of 5 seconds.
- Remove or reinsert the cable while transferring data.
- Connect two or more scanners to a single computer.

The USB and IEEE 1394 connectors cannot be used at the same time. Do not connect both the USB and IEEE 1394 cables to a computer, or to two separate computers, at the same time.

Connecting the scanner via a USB 2.0 interface

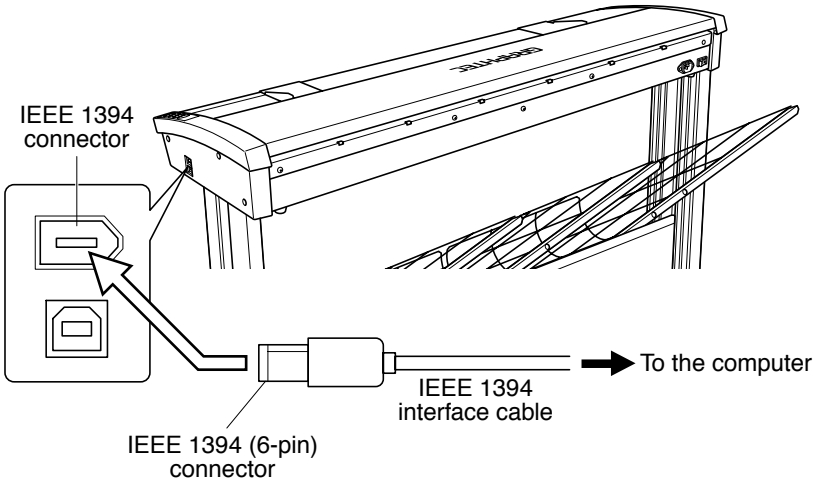
(1) Ensure that you have a USB 2.0 interface cable that works with your computer. Plug the USB 2.0 interface cable into the USB connector socket situated on the right-hand side of the scanner unit.



Connecting the scanner via an IEEE 1394 interface

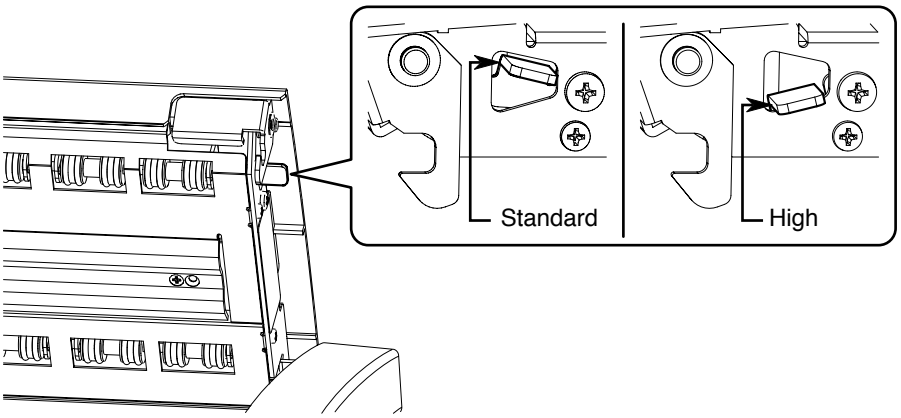
(1) Ensure that you have an IEEE 1394 interface cable that works with your computer.

Plug the IEEE 1394 interface cable (6-pin) into the IEEE 1394 connector socket situated on the right-hand side of the scanner unit.



3.4 Making the Document Hold-Down Unit Force Settings

Changing the position of the lever at the right side of the top cover enables you to switch between two hold-down force settings. Use this facility according to the status of the document to be scanned.



High ..... Use this setting with:

- Plain paper with a thickness of 0.8 mm or higher
- Documents with creases or strongly curled documents where the creases or curl affect the scanning quality

Standard ..... This mode is normally used to scan a document.

⚠CAUTION

- Do not use the “High” setting with paper less than 0.8 mm thick or with fine or limp documents, as the document may become damaged or jammed in the scanner. The “High” setting has a stronger hold-down force than that of the “Standard” setting, and may cause damage to thin documents. In addition, because the precision accuracy also differs, a distance correction operation may need to be performed when you switch from one setting to the other.
- Use the carrier sheet when scanning film documents or similar.
- Be sure to use the “Standard” setting with photographs or other documents that have a glossy surface. If you use the “High” setting, the document may stick to the scanner glass and adversely affect the scanning quality.
- Always ensure that you check the lever status before using the scanner, because the modes may switch if the scanner has been subjected to a strong vibration as a result of being dropped or shaken.

4. INSTALLING THE SOFTWARE

CHECKPOINT

The procedure outlined below is based on the requirement that you are logged on to Windows with administrator rights. Consult your Windows 2000 or Windows XP manual for more information.

4.1 Installing the Driver Software for Windows 2000

The following procedure assumes that you are using the CS400 as part of your system, and that you are using the USB interface. If you are using the IEEE 1394 interface, GRAPHTEC CS400-10 IEEE 1394 SBP2 Device will be displayed where CS400-10 is displayed when the USB interface is used. Substitute CS300-10 for CS400-10 for guidelines as to how to use the CS300.

(1) Connect the scanner to the computer, and turn on the computer's power. Insert the CD-ROM disk (included with your computer) into the CD-ROM drive of the computer after Windows has started up, and then turn on the scanner's power.

(2) The message below appears.

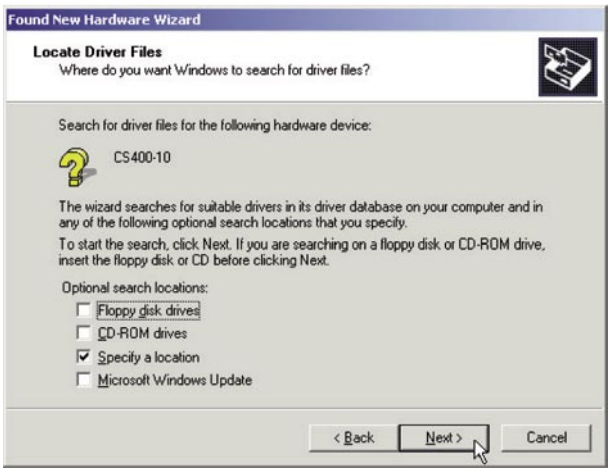
(3) Next, the Found New Hardware Wizard appears.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install a device driver for a hardware device.
To continue, click Next.
< Back
Next >
Cancel

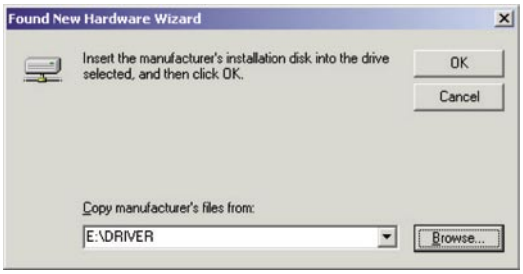
(4) Click the Next button to proceed to the menu for installing the driver.

Found New Hardware Wizard
Install Hardware Device Drivers
A device driver is a software program that enables a hardware device to work with an operating system.
This wizard will complete the installation for this device:
CS400-10
A device driver is a software program that makes a hardware device work. Windows needs driver files for your new device. To locate driver files and complete the installation click Next.
What do you want the wizard to do?
Search for a suitable driver for my device (recommended)
Display a list of the known drivers for this device so that I can choose a specific driver
< Back
Next >
Cancel

(5) Select the option “Search for a suitable driver for my device (recommended)” and click Next.


Found New Hardware Wizard
Locate Driver Files
Where do you want Windows to search for driver files?
Search for driver files for the following hardware device:
CS400-10
The wizard searches for suitable drivers in its driver database on your computer and in any of the following optional search locations that you specify.
To start the search, click Next. If you are searching on a floppy disk or CD-ROM drive, insert the floppy disk or CD before clicking Next.
Optional search locations:
Floppy disk drives
CD-ROM drives
Specify a location
Microsoft Windows Update
< Back
Next >
Cancel

(6) Select the check box entitled “Specify a location” and click Next.



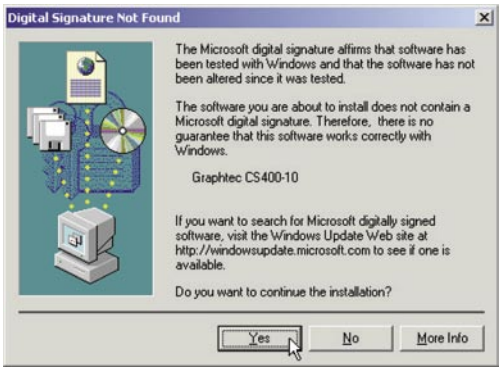
Click Browse and select the DRIVER folder in the CD-ROM drive or enter a CD-ROM drive name and \DRIVER using the keyboard.

Example: For drive E, enter “E:\DRIVER.”

(7) When you click OK the wizard will start searching for the driver. The screen shown below is displayed when the wizard has finished searching.

Found New Hardware Wizard
Driver Files Search Results
The wizard has finished searching for driver files for your hardware device.
The wizard found a driver for the following device:
CS400-10
Windows found a driver for this device. To install the driver Windows found, click Next.
e:\driver\gtcscan.inf
< Back
Next >
Cancel

(8) The screen shown below is displayed when you click Next.


Digital Signature Not Found
The Microsoft digital signature affirms that software has been tested with Windows and that the software has not been altered since it was tested.
The software you are about to install does not contain a Microsoft digital signature. Therefore, there is no guarantee that this software works correctly with Windows.
Graphtec CS400-10
If you want to search for Microsoft digitally signed software, visit the Windows Update Web site at http://windowsupdate.microsoft.com to see if one is available.
Do you want to continue the installation?
Yes
No
More Info

Click Yes to continue the installation.

(9) The screen shown below is displayed when the wizard has finished installing the driver.

Click the Finish button.

(10) The Windows 2000 Desktop appears and the Scanner is acknowledged by the computer.

4.2 Installing the Driver Software for Windows XP

The following procedure assumes that you are using the CS400 as part of your system, and that you are using the USB interface. If you are using the IEEE 1394 interface, GRAPHTEC CS400-10 IEEE 1394 SBP2 Device will be displayed where CS400-10 is displayed when the USB interface is used. Substitute CS300-10 for CS400-10 for guidelines as to how to use the CS300.

(1) Connect the scanner to the computer, turn on the scanner first, and then turn on the computer. When Windows starts up, insert the CD-ROM supplied with the scanner in the CD-ROM drive. Turn on the power to the scanner.

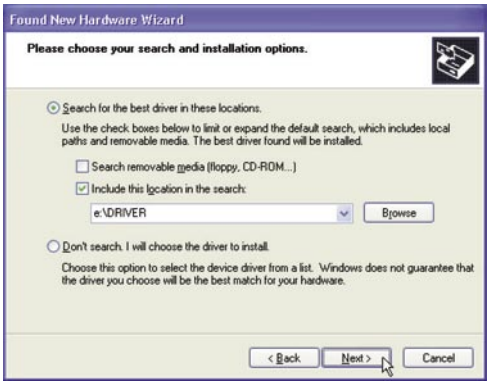
(2) When Windows XP starts up, the following window appears.

(3) Next, the Found New Hardware Wizard window appears.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install software for:
CS400-10
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

Select the option “Install from a list or a specific location (Advanced)”.

(4) The screen shown below is displayed when you click Next.

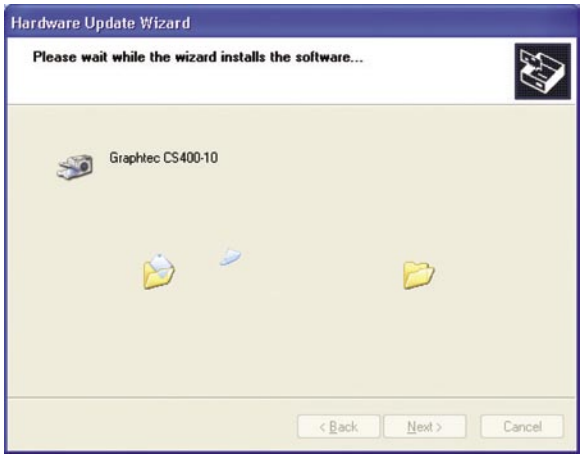

Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
e:\DRIVER
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

Select the option “Search for the best driver in these locations” and select the check box entitled “Include this location in the search”.

Click Browse and select the DRIVER folder in the CD-ROM drive or enter a CD-ROM drive name and \DRIVER using the keyboard.

Example: For drive E, enter “E:\DRIVER.”

(5) When you click Next the wizard will start searching for the driver.

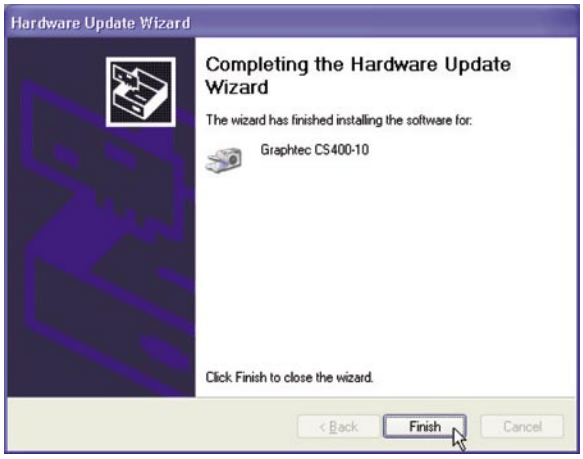


(6) The screen shown below is displayed.

Hardware Installation
The software you are installing for this hardware:
Graphtec CS400-10
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

Click Continue Anyway to continue the installation.

(7) The screen shown below is displayed when the wizard has finished installing the driver.



Click the Finish button to close the “Welcome to the Found New Hardware” wizard.

(8) The Windows XP desktop appears, and the scanner is recognized by the computer.

4.3 Checking the Interface Connection for Windows 2000

The procedure outlined below assumes that the CS400 is connected in your system.
Substitute CS300-10 for CS400-10 for guidelines as to how to use the CS300.

(1) Launch the Control Panel using the Start menu.

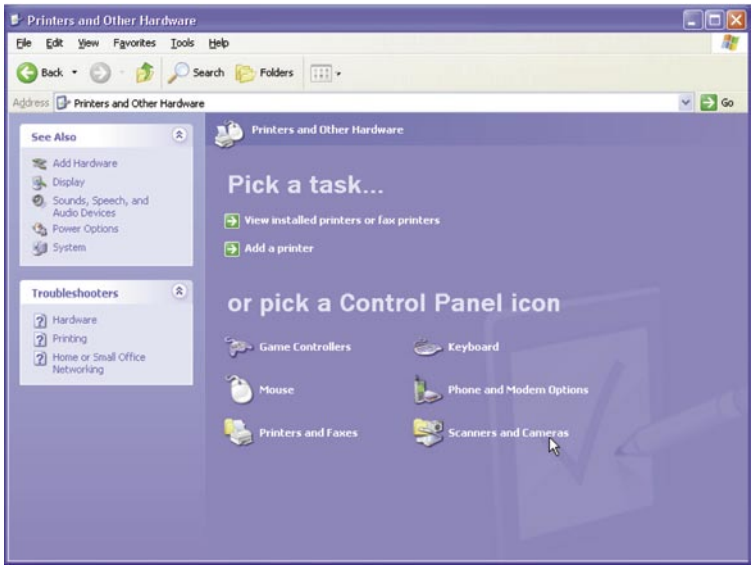
(2) The screen shown below is displayed when you click on the **"Scanners and Cameras"** icon.

Ensure that **"Graphtec CS400-10 or CS300-10"** is indicated here.

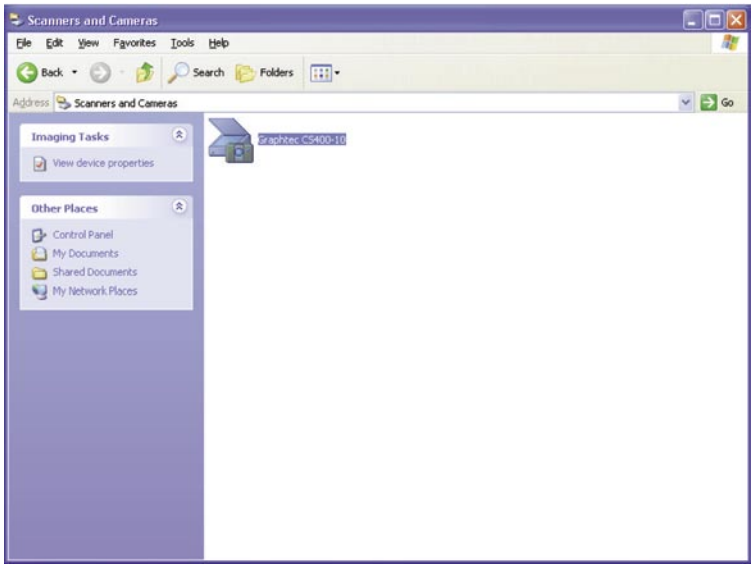
4.4 Checking the Interface Connection for Windows XP

The procedure outlined below assumes that the CS400 is connected in your system.
Substitute CS300-10 for CS400-10 for guidelines as to how to use the CS300.

(1) Launch the Control Panel using the Start menu.



(2) The screen shown below is displayed when you click on the **"Printers and Other Hardware"** icon.



(3) The screen shown below is displayed when you click on the **"Scanners and Cameras"** icon.
Ensure that **"Graphtec CS400-10" or "Graphtec CS300-10"** is indicated here.

4.5 Installing the Scanning Master 21+ Application

The Scanning Master 21+ “OPS112” is a software application for using a Graphtec scanner to scan image data.

Operating Environment

Windows 2000 Professional/XP Professional/XP Home Edition

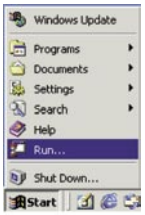
Installation Procedure

(The following steps are explained using the Windows 2000 windows.)

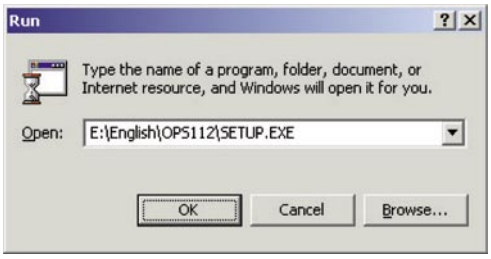
(1) Boot Windows 2000.

(2) Insert the User Guide CD-ROM containing the OPS112 program files into the computer’s CD-ROM drive.

(3) Click the Taskbar’s Start button, then click the Run... icon.



(4) Enter the CD-ROM drive name and English\OPS112\SETUP.EXE as the name of the file you wish to open.
If the disk is in drive E, for example, enter **“E:\English\OPS112\SETUP.EXE”** in the box.



(5) Click the OK button to run the OPS112 setup program. From this point on, follow the setup program’s instructions to install the OPS112 application.

• If the application has been properly installed, **“Scanning Master 21+”** will be newly listed in the Program menu accessed from the Start button.

TIP

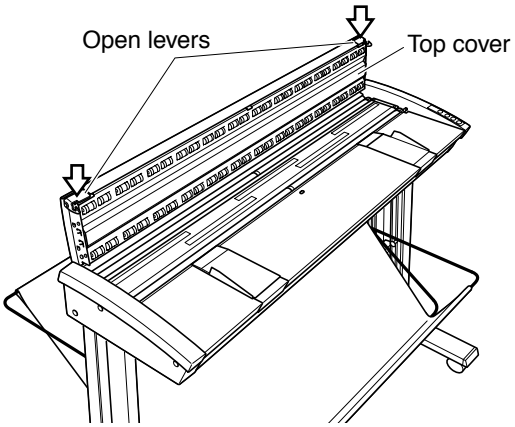
For more details, open the README.TXT file provided in the “Scanning Master 21+” folder.

5. DAILY MAINTENANCE

5.1 Opening and Closing the Top Cover

(1) Turn off the scanner's power.

(2) Push the left and right open levers on the top cover to unlock them, and hold the middle part of the top cover while you open the top cover by about 90 degrees.

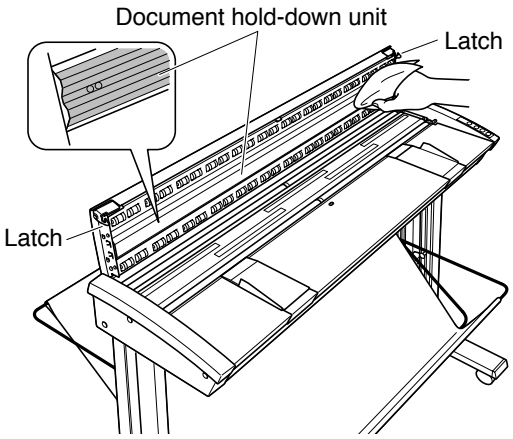


(3) Close the top cover until the left and right latches on the top cover lock into position, making sure that you don't get your fingers caught.

5.2 Cleaning the Document Hold-Down Unit

(1) Turn off the scanner.

(2) Open the top cover as described in Section 5.1 “Opening and Closing the Top Cover”.



(3) Wipe clean the underside of the document hold-down unit (see below) using a soft cloth that has been soaked in water or diluted neutral detergent and thoroughly wrung out.

(4) Wipe the document hold-down unit once again using a soft, dry cloth (remove all moisture).

(5) Close the top cover as described in Section 5.1 “Opening and Closing the Top Cover”.
Take care not to get your fingers caught in the cover.

⚠CAUTION

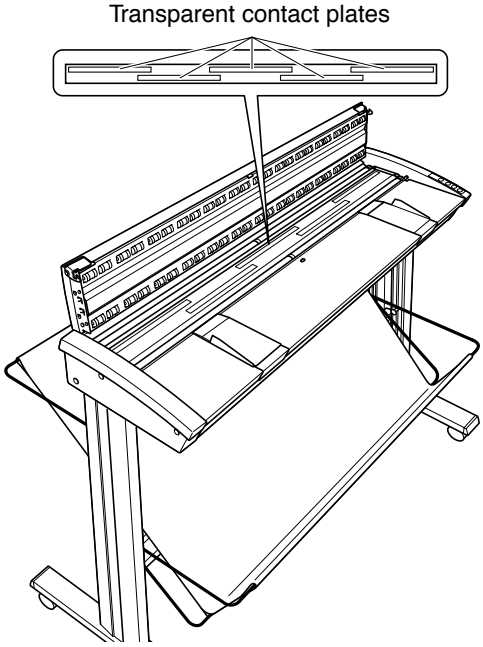
Scanning may be affected if the underside of the document hold-down unit becomes scratched or dirty. It must be cleaned when necessary.

5.3 Cleaning the Image Sensors

The scanner's image quality drops when the transparent contact plates over the image sensors become dirty, so clean the image sensors whenever necessary.

Procedure

(1) Turn off the scanner.
(2) Open the top cover as described in Section 5.1 "Opening and Closing the Top Cover".
(3) As shown below, wipe off any soiled areas on the transparent contact plates using a soft cloth that has been moistened with water or a neutral detergent (diluted with water) and firmly wrung out.



(4) Completely remove any moisture on the transparent contact plates by wiping them off again using a soft, dry cloth.
(5) Close the top cover as described in Section 5.1 "Opening and Closing the Top Cover".
Take care not to get your fingers caught in the cover.

CHECKPOINT

Do not use a commercial cleaner for office equipment, a glass cleaner, or chemical solvents such as solutions containing alcohol.

⚠CAUTION

Although the glass scanning table is not a maintenance part that requires periodic replacement, it is a consumable part because its surface may receive slight scratches due to minute particles of dust and other foreign matter. If document scanning produces unsatisfactory results (unexpected white or black streaks in the data) due to scratches on the glass table or other reasons, please perform the calibration procedure (see Section 5.4, "1. Calibration"). If the scanning results do not improve after calibration, the glass table will need to be replaced.

5.4 Cleaning the Paper Sensors

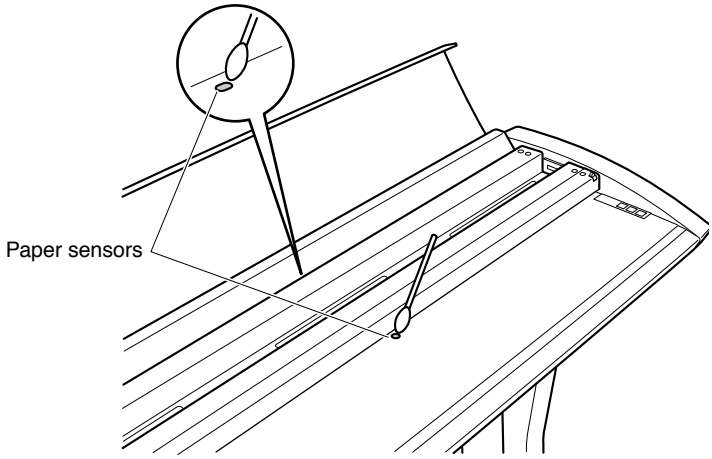
⚠CAUTION

Accumulated dust on the paper sensors may prevent the document from being detected. The sensors must be cleaned when necessary.

(1) Turn off the scanner.

(2) Open the top cover as described in Section 5.1 “Opening and Closing the Top Cover”.

(3) Wipe the two paper sensors using a cotton swab.



(4) Close the top cover as described in Section 5.1 “Opening and Closing the Top Cover”.
Take care not to get your fingers caught in the cover.

⚠CAUTION

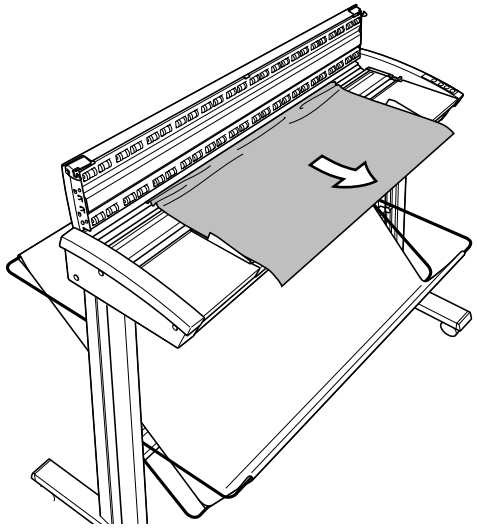
Use a cotton swab or something equally soft to gently wipe the paper sensors. Do not use any chemicals to clean the sensors.

5.5 Removing a Jammed Document

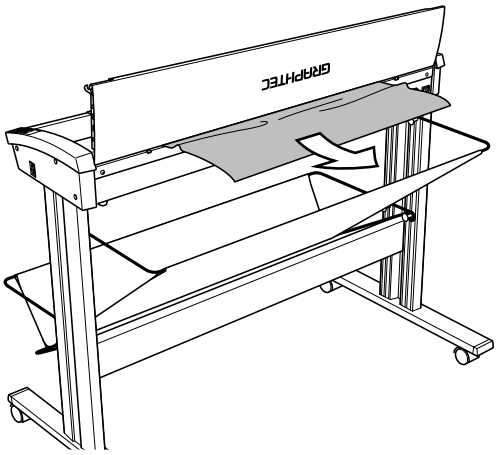
If a document becomes jammed in the scanner during scanning or another operation, immediately turn off the scanner, remove the document hold-down unit, and then remove the jammed document.

Procedure

(1) Turn off the scanner.
(2) Open the top cover as described in Section 5.1 “Opening and Closing the Top Cover”.
(3) If the document is jammed at the front, remove the document from the inside or by pulling it forward.



(4) If the document is jammed at the rear, remove the document from the inside by pulling it toward the rear.



(5) Close the top cover as described in Section 5.1 “Opening and Closing the Top Cover”.
Take care not to get your fingers caught in the cover.

5.6 Calibration

Calibrate the scanner if scanning quality is observed to deteriorate, with scanned results such as those described below:

- The scanned image is distorted
- Areas of uneven color appear in the scanned image
- Other unsatisfactory results (but not including problems related to media quality, such as folds, wrinkling, or paper curling)

⚠CAUTION

- Handle the calibration sheet with care so that it does not get bent. To prevent soiling, store it in its special storage box. The calibration sheet cannot be used if it is bent or soiled.
- The calibration sheet is a paper product. Do not attempt to clean it with any type of liquid cleaner.
- The calibration sheet is a consumable item. Replacement sheets can be purchased from your sales representative or nearest Graphtec vendor.

Preparation and checks

Recommended usage environment

- Monitor: 1024 x 768 pixels, High Color or better resolution

TIP

A low-resolution monitor will make it difficult to discern any problem areas.

Launching the Scanner Adjustment Program

(1) Connect the scanner to the PC and switch on the scanner. Switch on the PC.
(2) Install Scanning Master 21+ (OPS112) if it is not already installed.
(3) Click the **Start** button, then select **Programs** > **Scanning Master 21+** > **Scanner Adjustment**.
(4) Click **Scanner Adjustment** to launch the **Scanner Adjustment** program.

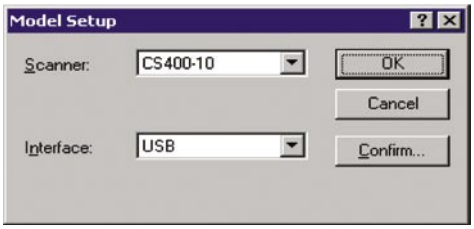
Scanner Calibration

Before beginning calibration, clean the transparent contact plates and scanner table surface.
Any dust or dirt on this surface may affect calibration results and resulting image quality.
Check that the calibration sheet is free of any dust or dirt.

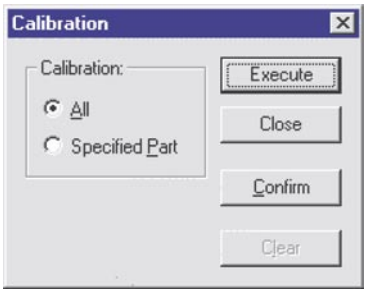
⚠CAUTION

The calibration procedure will take some time. Do not switch off the scanner while calibration is underway. Accidentally switching off the scanner may result in damage that requires servicing.

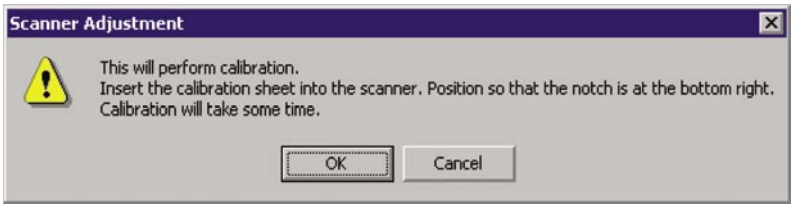
(1) Connect the scanner to the computer. Switch on the scanner, then switch on the PC.
(2) Launch the **Scanner Adjustment** program (as described earlier).
(3) Select **Model Setup** on the **Scanner** menu.



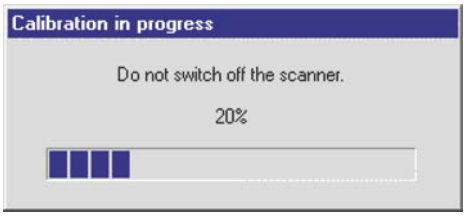
(4) Select the connected scanner and click the **OK** button.
(5) Select **Calibration** on the **Scanner** menu.



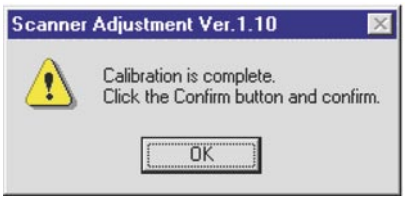
(6) Select **All** in Calibration and click the **Execute** button.
(7) The following message is displayed. Insert the calibration sheet into the scanner as instructed.


Scanner Adjustment
This will perform calibration.
Insert the calibration sheet into the scanner. Position so that the notch is at the bottom right.
Calibration will take some time.
OK
Cancel

(8) Clicking the **OK** button begins calibration.



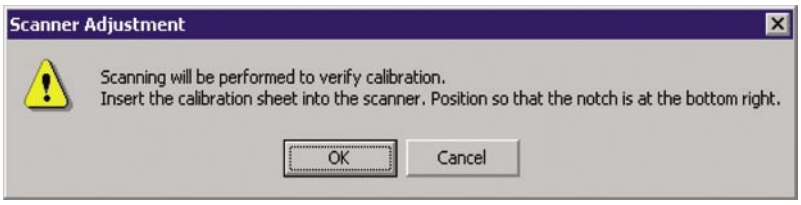
(9) Calibration ends after approximately 10 minutes.



Click the **OK** button to complete calibration.

(10) To check the calibration results, click the **Confirm** button in the **Calibration** menu (shown in step (5) above).

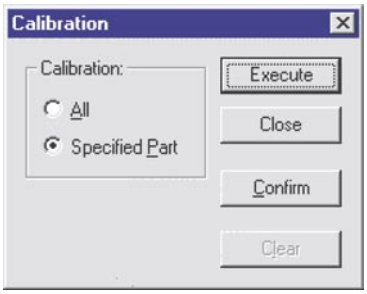
(11) The following message is displayed. Insert the calibration sheet into the scanner as instructed.


Scanner Adjustment
Scanning will be performed to verify calibration.
Insert the calibration sheet into the scanner. Position so that the notch is at the bottom right.
OK
Cancel

(12) Click the **OK** button to start scanning.
The scanned data is displayed when scanning is complete. Colors may differ slightly for individual sensors to make it easier to identify problem areas in calibration. This does not indicate a defect.
Check that there are no vertical streaks, such as white patches, in the scanned data.
(Streaks occur when calibration is not performed correctly due to contamination by dust or dirt.)

(13) If the data is normal, calibration is complete.
Click the **Close** button and exit the **Scanner Adjustment Program**.

(14) If any abnormal data is observed, specify the problem areas as follows:
Select Specified Part in Calibration.



(15) The mouse arrow cursor changes to a cross cursor when moved over the data. Click the left mouse button with the mouse positioned over the streak data. The selected area is shown in blue. Repeat this procedure for any additional streaks.
Areas that have been selected (shown in blue) can be deselected by clicking the left mouse button again. To deselect all selected areas, click the Clear button.

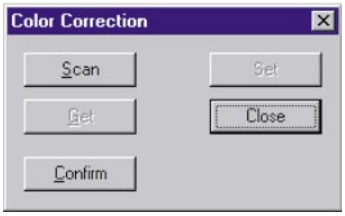
(16) Once all required areas have been specified, remove the calibration sheet and clean the glass and table surfaces. Check the calibration sheet for dust and dirt, then click the Execute button.

(17) Return to step (10) and verify the calibration results.

Color Correction

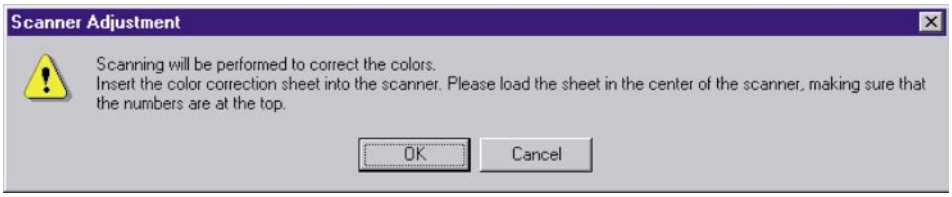
Perform color correction if there is any discrepancy in color in parts of the scanned image even after you have calibrated the scanner.

(1) Select Color Correction on the Scanner menu.



(2) Click the Scan button.

(3) The following message is displayed. Insert the color correction sheet in the scanner.


Scanner Adjustment
Scanning will be performed to correct the colors.
Insert the color correction sheet into the scanner. Please load the sheet in the center of the scanner, making sure that the numbers are at the top.
OK
Cancel

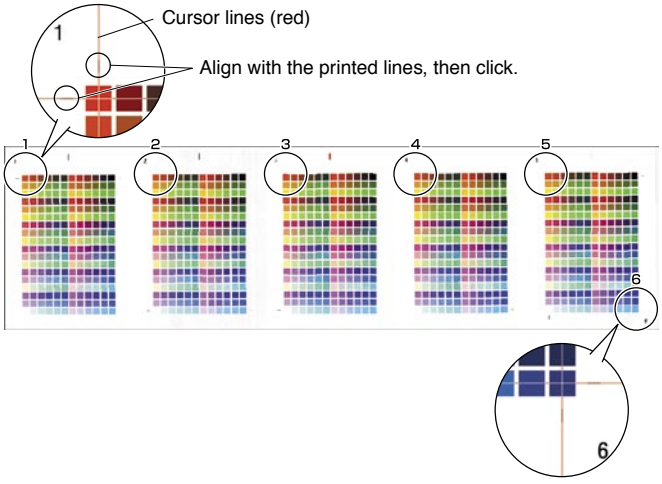
CHECKPOINT

Position the color correction sheet so that the red bar in the center of the sheet is centered in the scanner (but with the printed side down).

(4) Click the OK button to start scanning.
The scanned data is displayed when scanning is complete. Colors may differ slightly for individual sensors, but this does not indicate a defect.

(5) When the data is displayed, click the Get button.

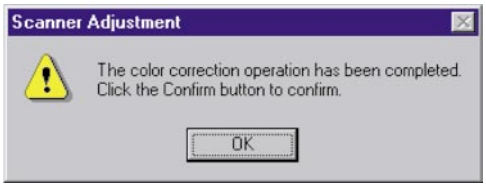
(6) Click in the center of the color tile indicated by the numbers 1 to 6, in ascending order.
For numbers 1 to 5, click the center of the upper left tile; for number 6, click in the center of the bottom right tile. Align the cursor crosshairs with the printed lines at the sides of the tile.



CHECKPOINT

- The next reference point to be checked is displayed on the Status bar.
- If you click in error, click the Esc. key to cancel the operation and return to the immediately previous step.
- If you click on the wrong tile, color correction will not be performed correctly and the colors of the image displayed after color correction will be incorrect.

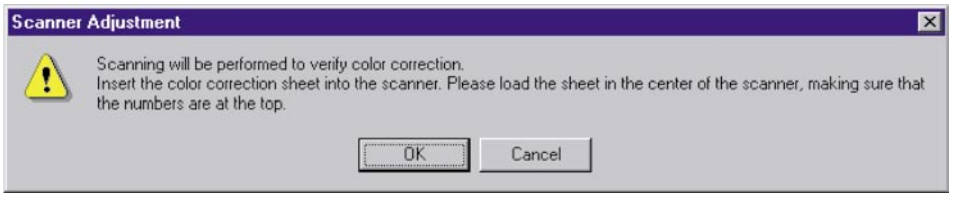
(7) After you have clicked tile number 6, click the Set button.



Click the OK button.

(8) To check the color correction results, click the Confirm button.

(9) The following message is displayed. Insert the color correction sheet in the scanner as instructed.


Scanner Adjustment
Scanning will be performed to verify color correction.
Insert the color correction sheet into the scanner. Please load the sheet in the center of the scanner, making sure that the numbers are at the top.
OK
Cancel

CHECKPOINT

Position the color correction sheet so that the red bar in the center of the sheet is centered in the scanner (but with the printed side down).

(10) Click the OK button to start scanning.
After scanning has been completed, an enlarged view of the color-corrected data is displayed.

(11) Click the Fit icon to display the entire image, and check whether there is any discrepancy in color. If there is no discrepancy, color correction is complete. Click the Close button.

CHECKPOINT

If there is still some color discrepancy after performing Color Correction, repeat steps (6) through (11).

6. RECOMMENDED PARTS LIST

No.	Part No.	Part Name	Description	Q'ty	Remarks
1	774015500	Data Controller Board		1	
2	774015501	CIS Controller Board		5	
3	774015502	Data Power Board		1	
4	774015503	CIS Power Board		1	
5	774015504	Motor Drive, 3-phase		1	
6	774015505	IEEE 1394 Board		1	
7	694500780	CIS Power Board Cable	3SB-2C-1	5	
8	694500790	Data Controller Board Power Cable	3SB-2C-2	1	
9	694500800	Motor Controller Board Power Cable	3SB-2C-3	1	
10	694500811	Motor (3-phase) Cable	3SB-2C-4A	1	
11	694500830	Motor Controller Cable	3SB-2C-6	1	
12	694500840	Switching Power Board to Power Board Cable	3SB-2C-7	1	
13	694500850	Primary Power Cable	3SB-2C-8	1	
14	694500860	CIS Board to Data Board Cable	3SB-2C-9	5	
15	694500870	Sensor Cable	3SB-2C-10	1	
16	694500880	Inlet to Power Switch Cable	3SB-2C-11	1	
17	500051795	CIS Sensor	CIPS218CF601	5	
18	500051794	Motor	KT60KM06-551	1	
19	308004002	Motor Damper	MOTOR MOUNT RF2600-A5	1	
20	641300000	Control Panel	3SB CONTROL PANEL	1	
21	500051793	Inlet	FN-9222R-3-06	1	
22	502112009	Power Switch	AJ7201B	1	
23	502210002	Paper Sensor	PS-R50L-A	2	
24	502211000	Cover Sensor	GP1A05A	1	
25	694450052	Fan	CS2000C-6A	1	
26	500051630	Switching Power Board	ZWS75AF-24/J	1	
27	314690020	Bearing	6900ZZNXR	4	SAME AS CS2000
28	341511001	O Ring	1AP12	12	SAME AS CS2000
29	378020021	Drive Belt	BELT 60S2M400	1	
30	774015027	Contact Glass 3mm	CONTACT GLASS 3mm	1	
31	641300130	Drive Roller	DRIVE ROLLER	2	
32	641300633	Paper Hold-down Plate	CS-JEC	1	SAME AS CS2000
33	641300100	Pinch Roller	PINCH ROLLER G	4	
34	641300110	Pinch Roller Shaft	SHAFT	1	
35	641300050	Front Guide CS400	FRONT GUIDE FOR CS400	1	
36	641400050	Front Guide CS300	FRONT GUIDE FOR CS300	1	

7. LIST OF JIGS AND TOOLS

7.1 Jigs

Jigs	Adjustments	Remarks
argos.X	•Downloading system program	Firmware (CS400/300.X)
OPS112 (Ver. 4.40 or later)	•Downloading system program •Shading (white correction) •Adjusting feed distance •Aligning sensor images •Adjusting offset •Color correction	Software supplied with the scanner (Scanning Master 21+)
Calibration sheet	•Shading (white correction) •Replacing main board	Standard accessory 1050 mm x 200 mm
Color correction sheet	•Color correction	Standard accessory
CS1000 adjustment test chart	•Adjusting feed distance •Adjusting offset •Aligning sensor images	Record measured values between a and c, b and d, a and b, c and d, a and d, and b and c.

7.2 Tools

Tools	Usage	Remarks
Screwdriver Allen wrench Needle-nose pliers	Disassembly, reassembly, and other operations	Large, medium, and small flat blade screwdrivers and Phillips screwdrivers
Colex gauge	Adjusting belt tension	200g / 4 mm displacement
Multimeter	Checking voltage level	

7.3 Other

Item	Usage	Remarks
Water-diluted neutral detergent or absolute ethanol wiper (cloth)	Cleaning	
PC USB cable	Used to determine whether the problem is caused by the scanner or any other equipment.	

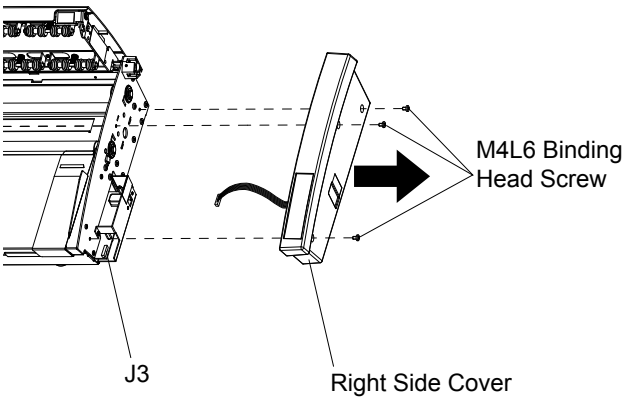
8. DISASSEMBLING AND ADJUSTING THE MECHANICAL PARTS

8.1 Right Side Cover

Detaching the right side cover

(1) Remove the three M4L6 binding head screws on the right side of the scanner unit.

(2) Detach the right side cover as shown below.



(3) Disconnect the connector J3 from the data power board.

Reattaching the right side cover

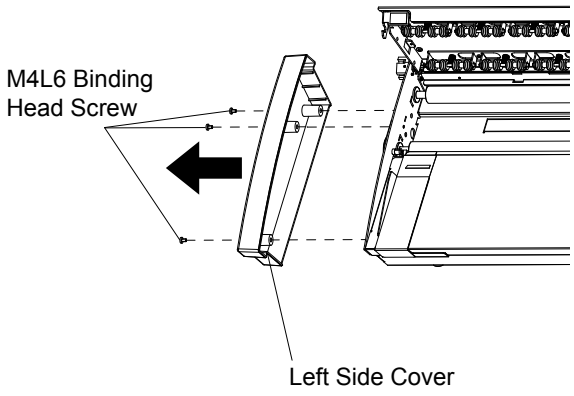
(1) Reattach the right side cover in the reverse order in which it was detached.

8.2 Left Side Cover

Detaching the left side cover

(1) Remove the three M4L6 binding head screws on the left side of the scanner unit.

(2) Detach the left side cover as shown below.



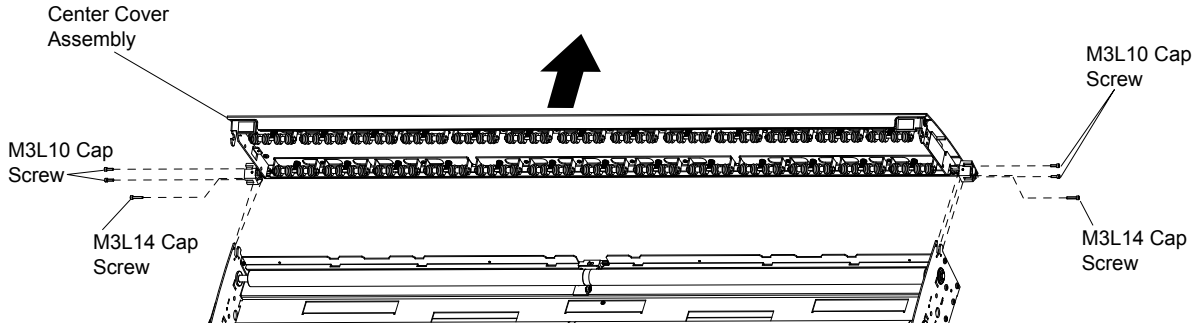
Reattaching the left side cover

(1) Reattach the left side cover in the reverse order in which it was detached.

8.3 Center Cover Assembly

Detaching the center cover

(1) Detach the right and left side covers (see Sections 8.1 and 8.2).
(2) Remove the four M3L10 cap screws and the two M3L14 cap screws on both sides of the plate.
(3) Detach the center cover assembly from the scanner unit as shown below.



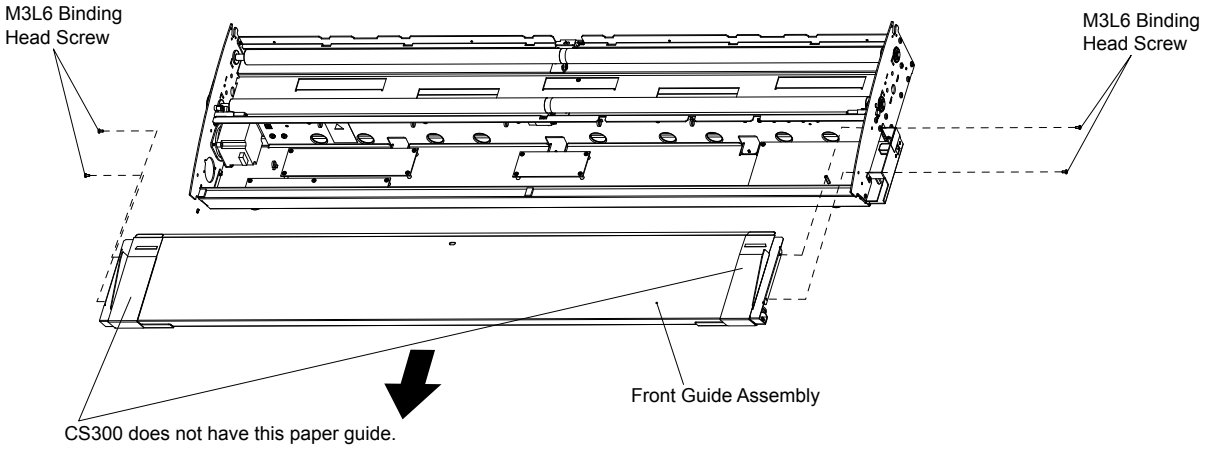
Reattaching the top cover

(1) Reattach the top cover in the reverse order in which it was detached.

8.4 Front Guide Assembly

Detaching the front guide assembly

(1) Detach the right and left side covers (see Sections 8.1 and 8.2).
(2) Remove the four M3L6 binding head screws holding the front guide assembly from each side.
(3) Detach the front center guide assembly as shown below.



Reattaching the front guide assembly

(1) Reattach the front guide assembly in the reverse order in which it was detached.

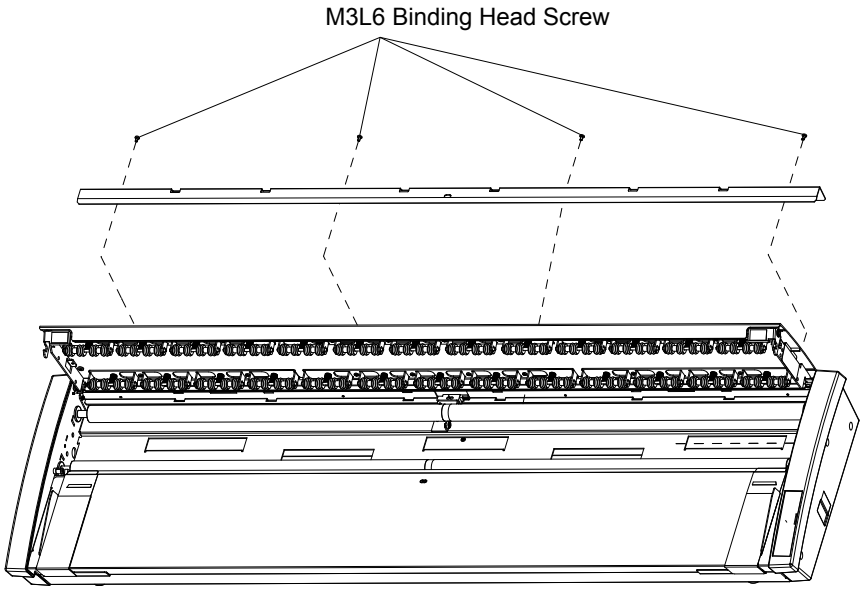
⚠CAUTION

When reattaching the front guide assembly, make sure that the front guide assembly does not touch the front drive roller.

8.5 Rear Cover

Detaching the rear cover

(1) Remove the four M3L6 binding head screws at the back of the scanner unit.



(2) Detach the rear cover.

Reattaching the rear cover

(1) Reattach the rear cover in the reverse order in which it was detached.

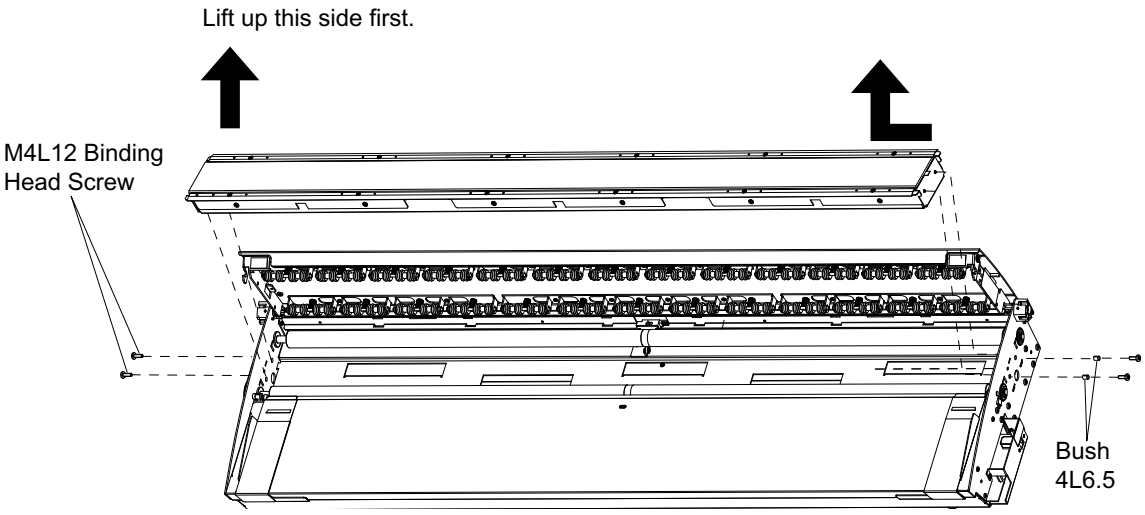
⚠CAUTION

When reattaching the rear cover, make sure that the rear cover does not touch the rear drive roller.

8.6 CIS Unit

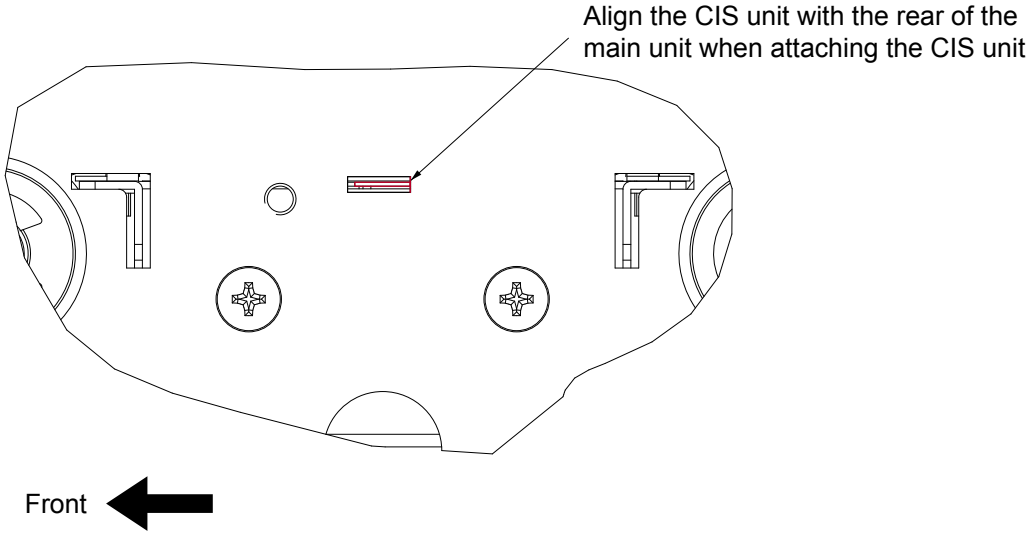
Detaching the CIS unit

(1) Detach the right and left side covers (see Sections 8.1 and 8.2).
(2) Remove the four M4L12 binding head screws and the two bushes at the left side of the scanner unit as shown below.
(3) Lift up the left side of the CIS unit and slide the CIS unit out to the left of the scanner unit.
(4) Disconnect the connectors from each CIS board.
(5) Detach the CIS unit.



Reattaching the bottom plates

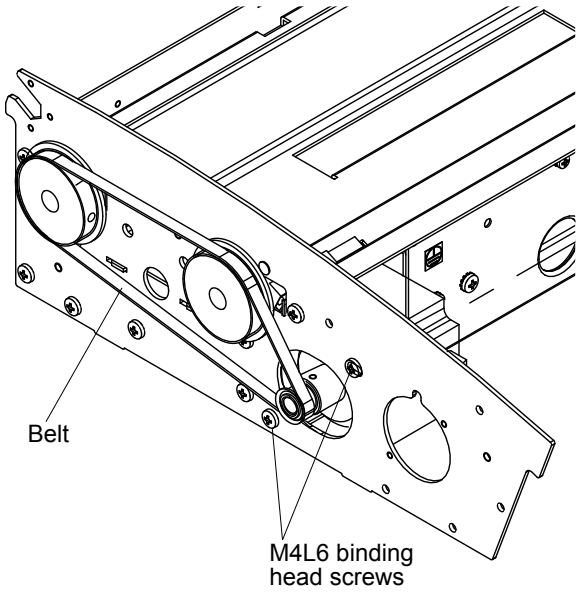
(1) Reattach the CIS unit by reversing the sequence of steps in which it was detached.
Align the CIS unit with the side of the main unit when attaching the CIS unit.



8.7 Motor

Detaching the motor

(1) Detach the left side cover (see Section 8.2).
(2) Detach the front guide assembly (see Section 8.4).
(3) Disconnect the J4 connector from the data power board.
(4) Remove the two M4L6 binding head screws holding the motor.
(5) Detach the drive belt from the pulleys.

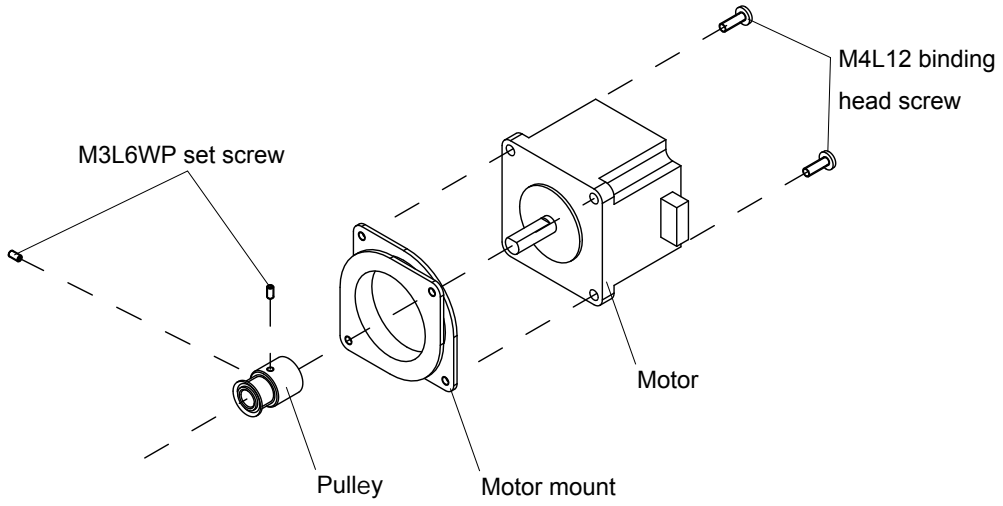


Reattaching the motor

(1) Reattach the motor by reversing the sequence of steps in which it was detached.
(2) Adjust the drive belt tension (see Section 8.10)

Disassembling the motor

(1) Loosen the M3L6WP set screws to detach the motor pulley.
Remove the two silver M4L12 binding head screws holding together the motor and motor mount.



Reattaching the motor

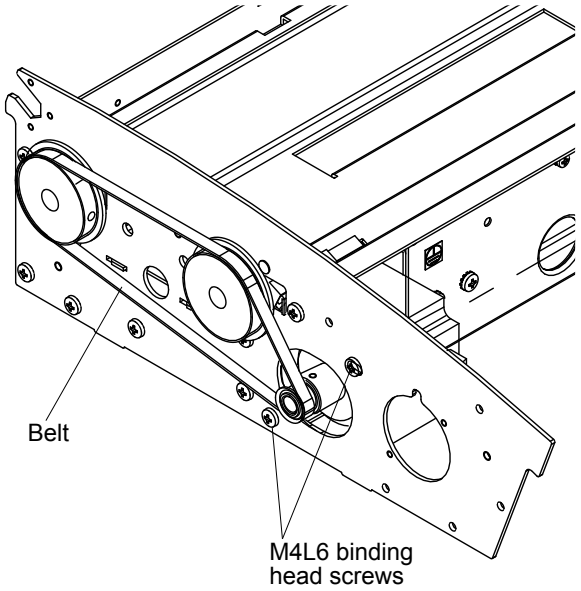
(1) Reattach the motor by reversing the sequence of steps in which it was detached.

8.8 Drive Roller Pulley

Detaching the drive roller pulleys

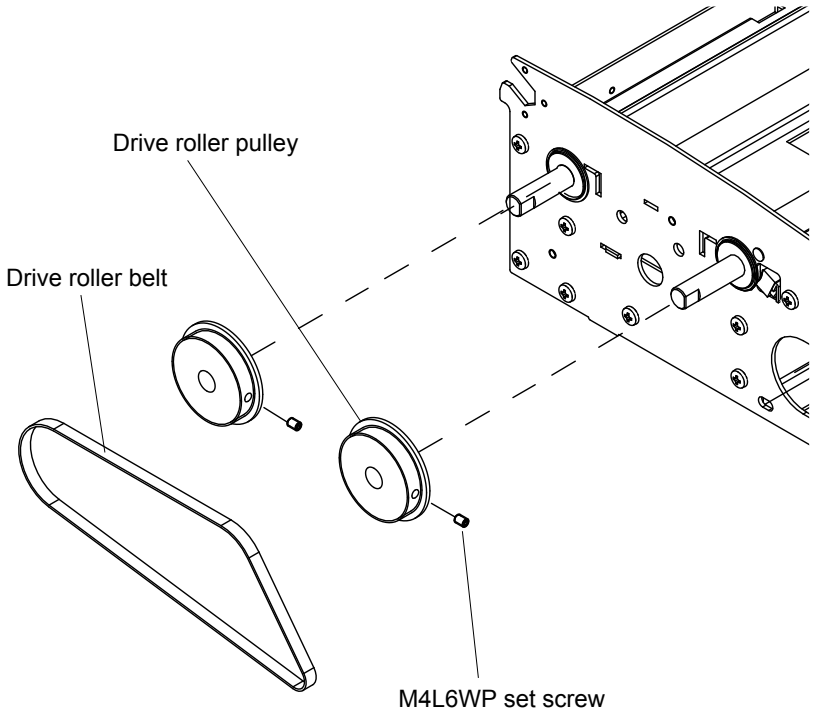
(1) Detach the left side cover (see Section 8.2).

(2) Loosen the two M4L6 binding head screws holding the motor.



(3) Detach the drive belt from the pulleys.

(4) Loosen the M3L6WP set screw to detach the drive roller pulley



Reattaching the drive roller pulleys

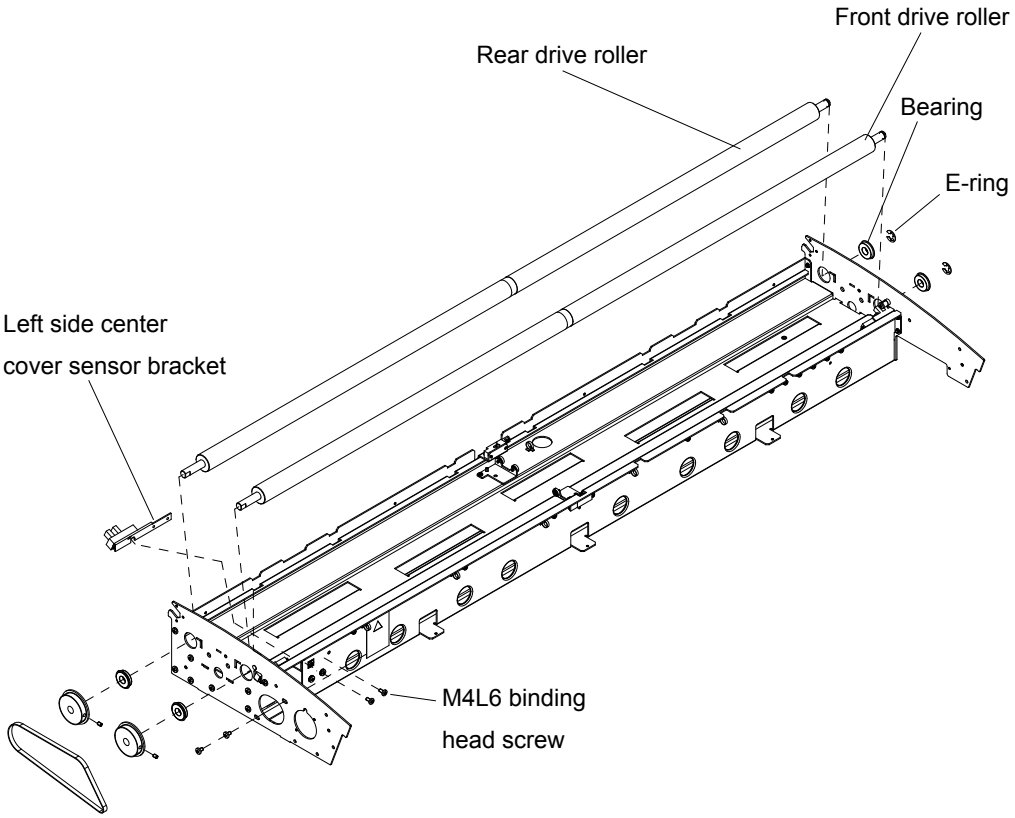
(1) Reattach the drive roller pulleys by reversing the sequence of steps in which they were detached.

(2) Adjust the belt tension (see Section 8.10)

8.9 Drive Rollers

Detaching the front drive roller

(1) Detach the right and left side covers (see Sections 8.1 and 8.2).
(2) Detach the front guide assembly (see Section 8.4).
(3) Detach the drive roller belt and the pulley from the drive roller (see Section 8.8).
(4) Detach the E-ring holding the drive roller.
(5) Detach the two bearings holding both ends of the drive roller.
(6) Remove the two M3L6 binding head screws holding the left side center cover sensor bracket.
(7) Disconnect the left side center cover sensor cable from the connector and then detach the left side center cover sensor together with the bracket.
(8) Slide the drive roller to the left, lift up the drive roller from the right side, and then detach it.



Detaching the rear drive roller

(1) Detach the right and left side covers (see Sections 8.1 and 8.2).
(2) Detach the rear guide (see Section 8.5).
(3) Detach the drive roller belt and the pulley from the drive roller (see Section 8.8).
(4) Detach the E-ring holding the drive roller.
(5) Detach the two bearings holding both ends of the drive roller.
(6) Slide the drive roller to the left, lift up the drive roller from the right side, and then detach it.

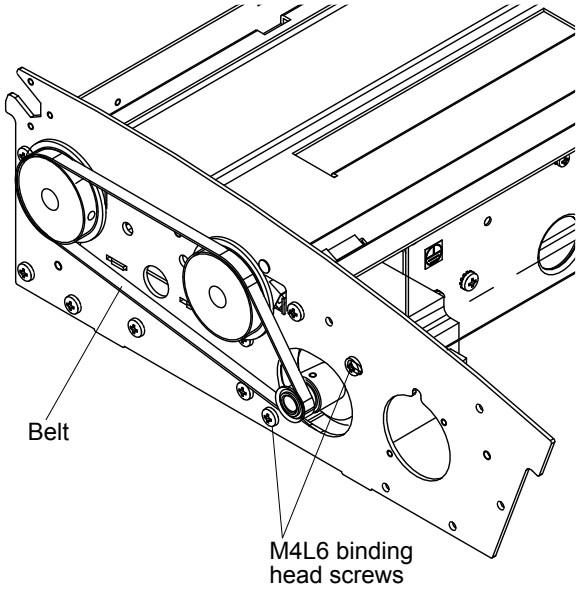
Reattaching the drive rollers

(1) Reattach the drive rollers by reversing the sequence of steps in which they were detached.
(2) Adjust the drive belt tension (see Section 8.10)

8.10 Drive Belt

Detaching the drive belt

(1) Detach the left side cover (see Section 8.2).
(2) Loosen the two M4L6 binding head screws holding the motor.
(3) Detach the drive belt from the pulleys.

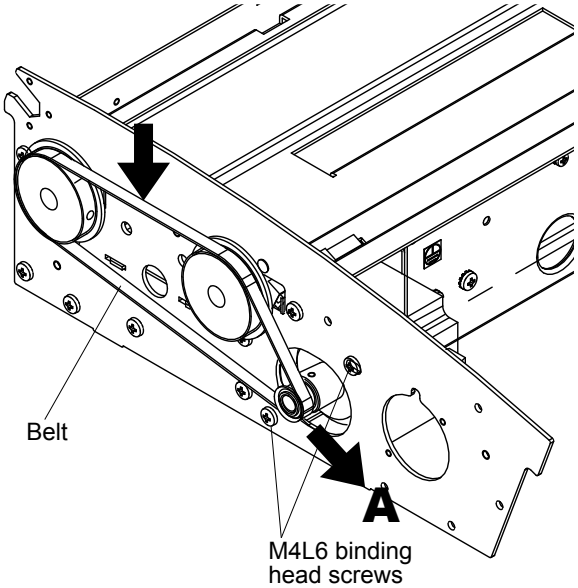


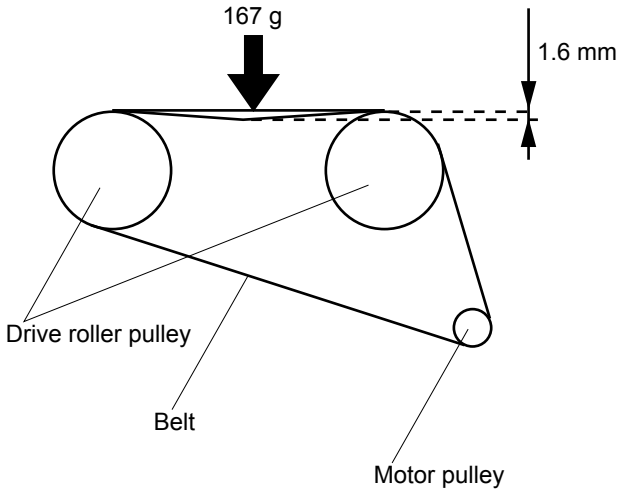
Reattaching the drive belt

(1) Reattach the drive belt by reversing the sequence of steps in which it was detached.
(2) Adjust the drive belt tension.

Adjusting the drive belt tension

(1) Loosen the two M4L6 binding head screws holding the motor.
(2) Pull the motor in the "A" direction as shown below.
(3) Use the Colex gauge to adjust the belt tension so that the belt displacement is approximately 1.6 mm when pressed with a force of 167 gf.



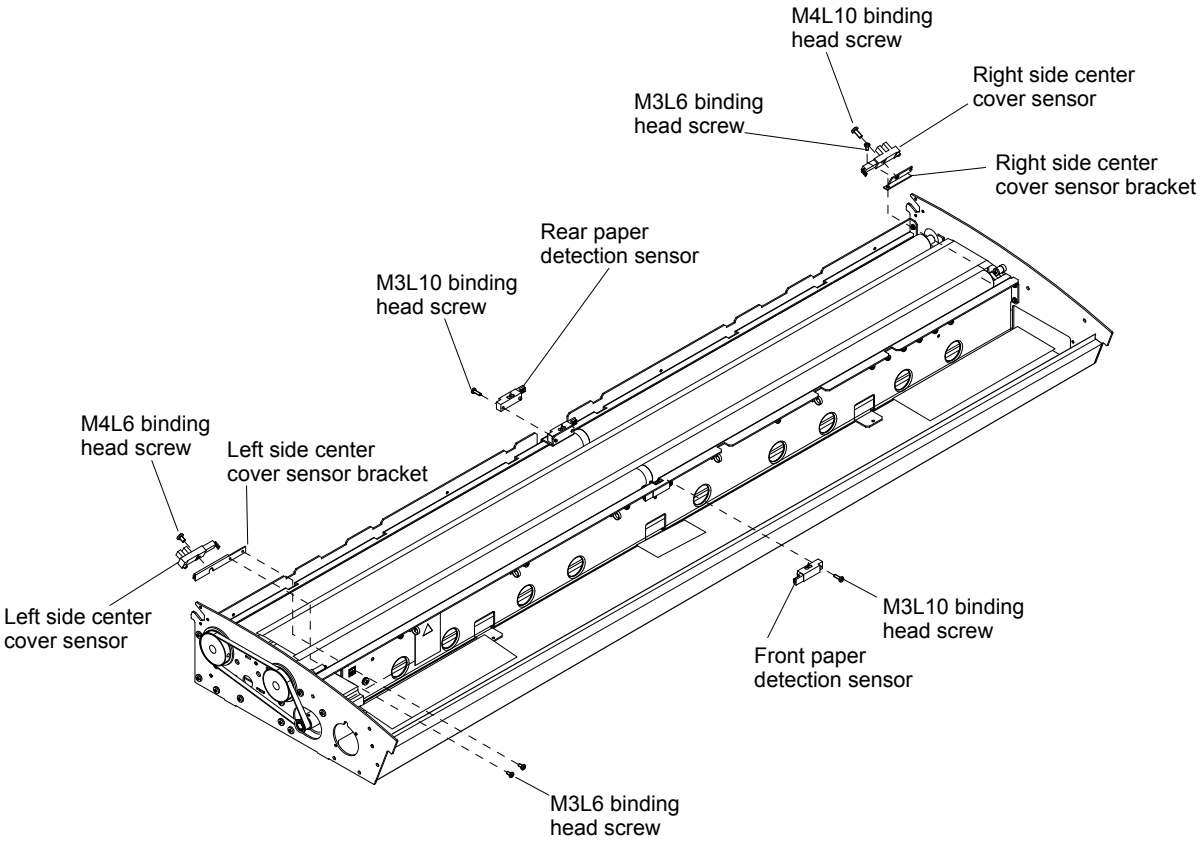


(4) Tighten the two M4L6 binding head screws holding the motor.

8.11 Center Cover Sensor

Detaching the left side center cover sensor

(1) Detach the right and left side covers (see Sections 8.1 and 8.2).
(2) Detach the front guide assembly (see Section 8.4).
(3) Remove the two M3L6 binding head screws holding the left side center cover sensor bracket.
(4) Disconnect the left side center cover sensor cable from the connector then detach the left side center cover sensor together with the bracket.
(5) Remove the M4L6 binding head screw holding the left side center cover sensor.


M4L10 binding head screw
Right side center cover sensor
M3L6 binding head screw
Right side center cover sensor bracket
Rear paper detection sensor
M3L10 binding head screw
M4L6 binding head screw
Left side center cover sensor bracket
Left side center cover sensor
M3L10 binding head screw
Front paper detection sensor
M3L6 binding head screw

Detaching the right side center cover sensor

(1) Detach the right and left side covers (see Sections 8.1 and 8.2).
(2) Detach the front guide assembly (see Section 8.4).
(3) Disconnect the right side center cover sensor cable from the connector.
(4) Remove the M3L6 binding head screw holding the right side center cover sensor bracket.
(5) Detach the right side center cover sensor together with the bracket.
(6) Remove the M4L10 binding head screw holding the right side center cover sensor.

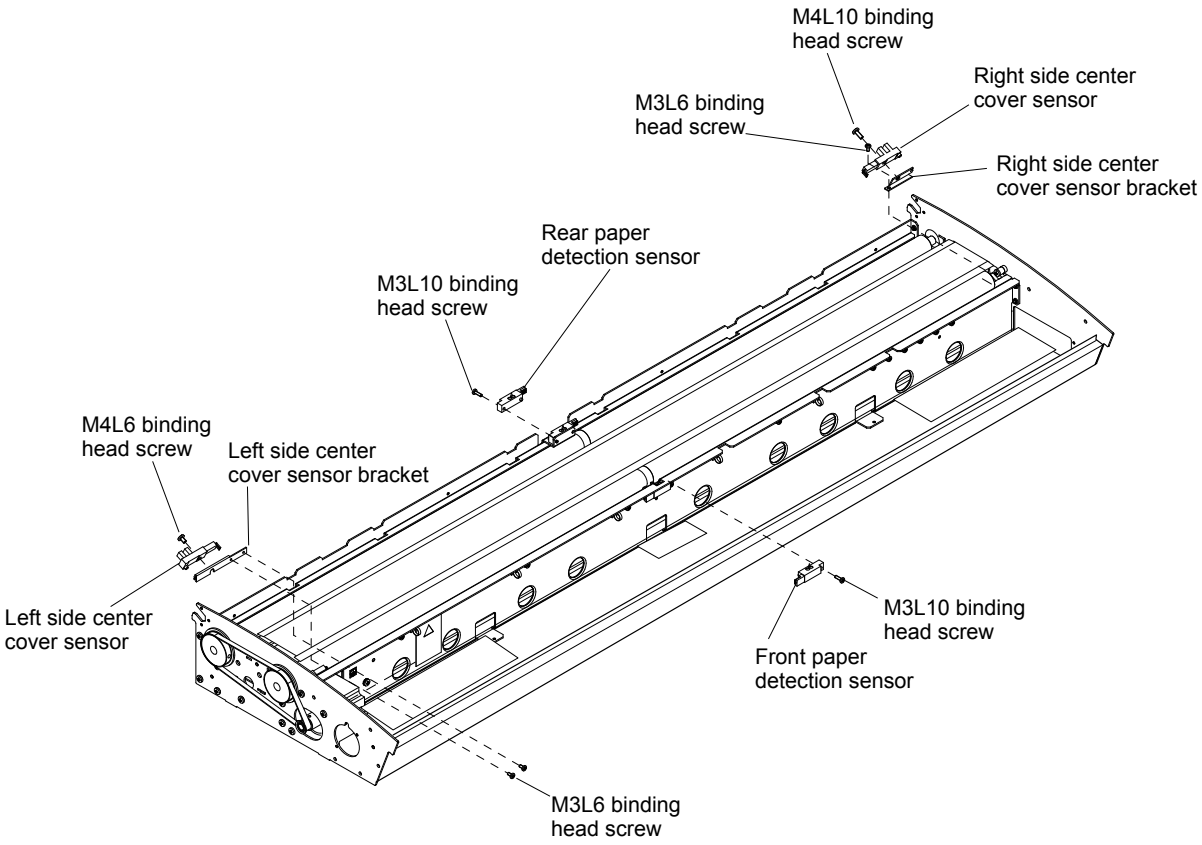
Reattaching the center cover sensors

(1) Reattach the center cover sensors by reversing the sequence of steps in which they were detached.

8.12 Front and Rear Paper Detection Sensors

Detaching the front paper detection sensor

(1) Detach the right and left side covers (see Sections 8.1 and 8.2).
(2) Detach the front guide assembly (see Section 8.4).
(3) Remove the M3L10 binding head screws holding the front paper detection sensor.
(4) Disconnect the front paper detection sensor cable from the connector and then detach the front paper detection sensor.


M4L10 binding head screw
Right side center cover sensor
M3L6 binding head screw
Right side center cover sensor bracket
Rear paper detection sensor
M3L10 binding head screw
M4L6 binding head screw
Left side center cover sensor bracket
Left side center cover sensor
M3L10 binding head screw
Front paper detection sensor
M3L6 binding head screw

Detaching the rear paper detection sensor

(1) Detach the rear guide (see Section 8.5).
(2) Remove the M3L10 binding head screws holding the rear paper detection sensor.
(3) Disconnect the rear paper detection sensor cable from the connector and then detach the rear paper detection sensor.

Reattaching the paper detection sensors

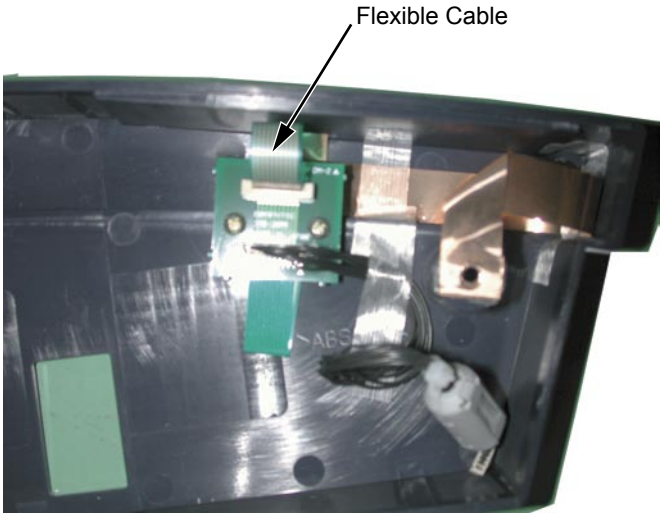
(1) Reattach the paper detection sensors by reversing the sequence of steps in which they were detached.

8.13 Control Panel Sheet Switch

Detaching the control panel sheet switch

(1) Detach the right cover (see Section 8.1).

(2) Disconnect the flexible cable from the control panel relay board and then pull off the control panel sheet switch from the right side cover.



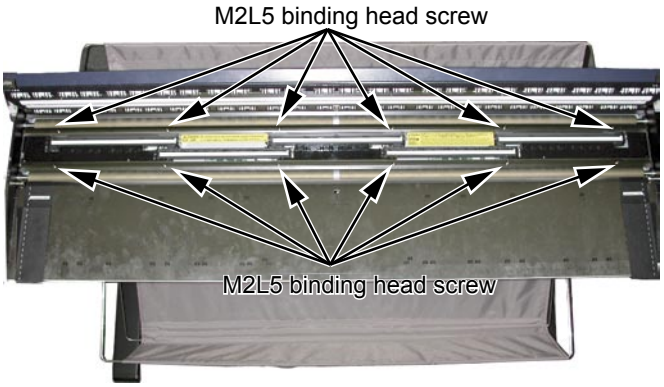
Reattaching the control panel sheet switch

(1) Reattach the new control panel switch in the reverse order in which it was detached.

8.14 Contact Glass Assembly

Detaching the contact glass assembly

(1) Open the center cover.
(2) Remove the six M2L5 binding head screws holding the front contact glass stopper plate.



(3) Detach the front contact glass stopper plate from the unit.
(4) Remove the six M2L5 binding head screws holding the rear contact glass stopper plate.
(5) Detach the rear contact glass stopper plate from the unit.
(6) Slide the contact glass assembly to the right side, lift up the contact glass from the left side, and then detach the contact glass assembly from the unit.

Reattaching the contact glass assembly

(1) Reattach the contact glass in the reverse order in which it was detached.
(2) Make sure that each of the CIS assembly surfaces lies flat against the inside of the contact glass assembly when you reattach the contact glass assembly.
(3) Perform the software adjustment.

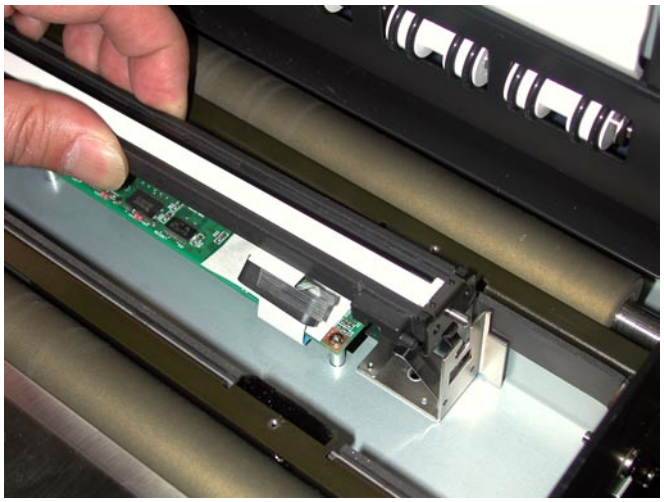
⚠CAUTION

When replacing the contact glass assembly, be sure to clean the interior of the image sensor unit and the inside of the contact glass assembly. A soiled or dusty unit can affect scanning performance.

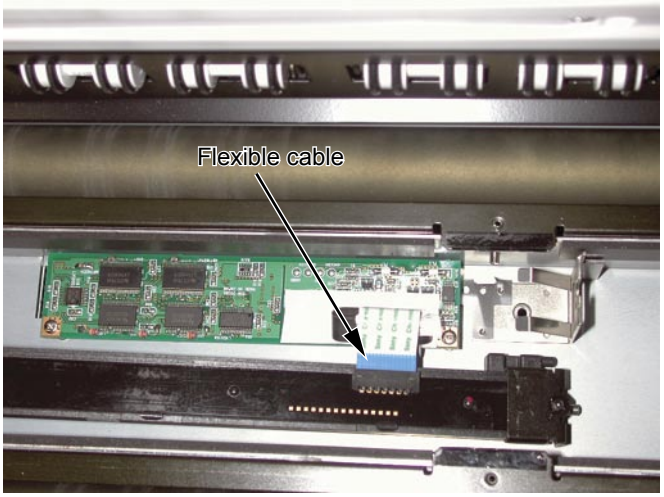
8.15 CIS (Charge Coupled Device Imaging Sensor) Assembly

Detaching the CIS assembly

(1) Detach the contact glass assembly (see Section 8.14).
(2) Slide each CIS assembly to the left side, lift it up from the right side, and then detach each CIS assembly.



(3) Disconnect the flexible cable from each CIS assembly and then detach each CIS assembly.



Reattaching the CIS assembly

(1) Reattach each CIS assembly in the reverse order in which it was detached.
(2) Perform the software adjustment.

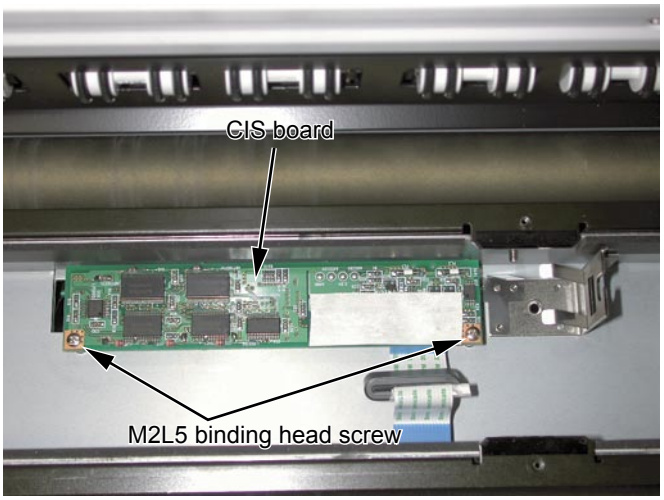
⚠CAUTION

When replacing the CIS assembly, be sure to clean the interior of the image sensor unit and the inside of the contact glass assembly. A soiled or dusty unit can affect scanning performance.

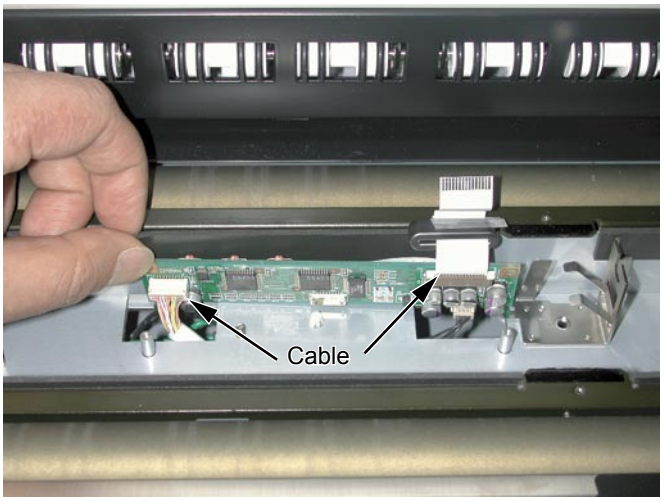
8.16 CIS (Charge Coupled Device Imaging Sensor) Board

Detaching the CIS boards

(1) Detach the contact glass assembly (see Section 8.14).
(2) Detach the each CIS (see Section 8.15).
(3) Remove the two M2L5 binding head screws supporting each CIS board.



(4) Disconnect the cables from each CIS board and then detach each CIS board.



Reattaching the CIS boards

(1) Reattach each CIS board in the reverse order in which it was detached.
(2) When you have replaced the CIS board, perform calibration using the software adjustment.

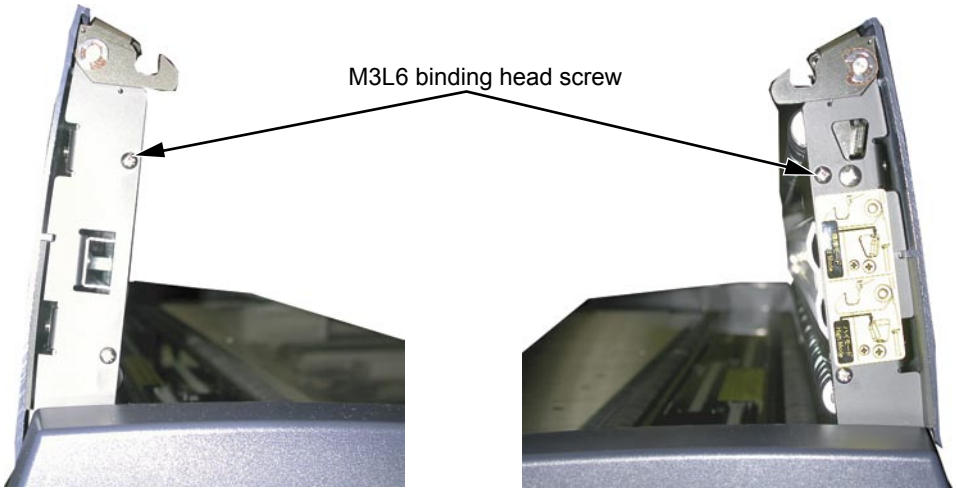
⚠CAUTION

When replacing the CIS board, be sure to clean the interior of the image sensor unit and the inside of the contact glass assembly. A soiled or dusty unit can affect scanning performance.

8.17 Document Hold-down Plate

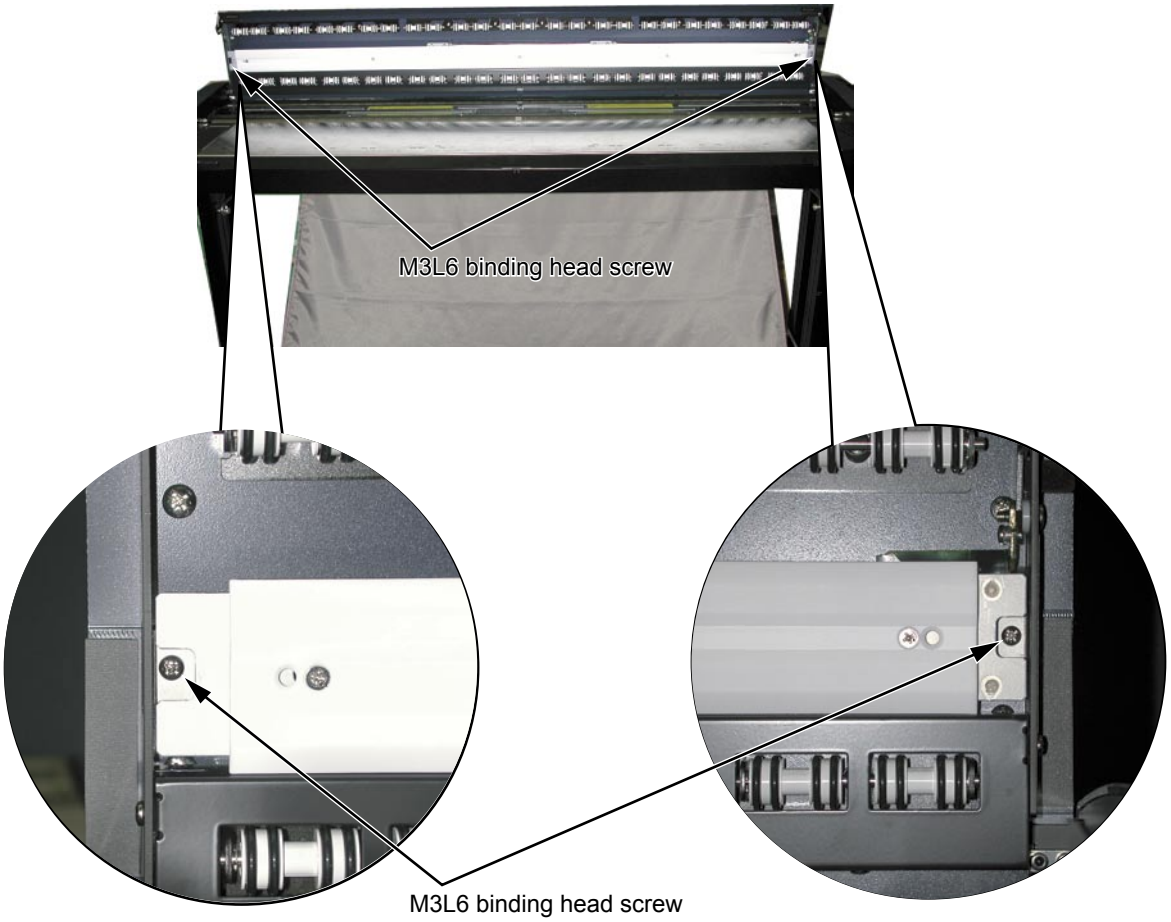
Detaching the document hold-down plate

(1) Remove the two M3L6 binding head screws holding the front pinch roller cover.



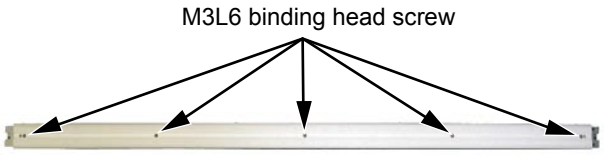
(2) Detach the front pinch roller cover from the center cover assembly.

(3) Remove the two M3L6 binding head screws holding the document hold-down assembly.



(4) Detach the document hold-down assembly from the center cover assembly.

(5) Remove the five M3L8 flat head screws holding the document hold-down plate and gently detach the document hold-down plate to prevent the springs inside from coming out.



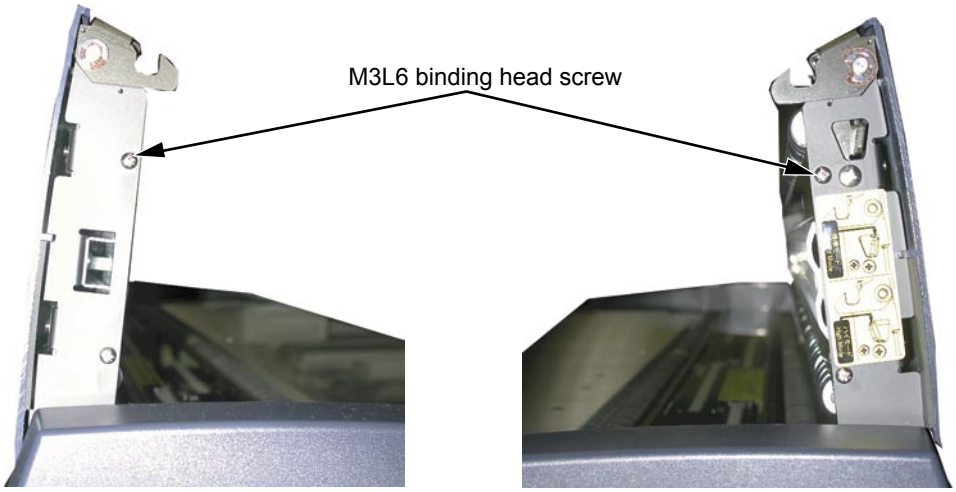
Reattaching the document hold-down plate

(1) Reattach the document hold-down plate in the reverse order in which it was detached.

8.18 Pinch Roller Units

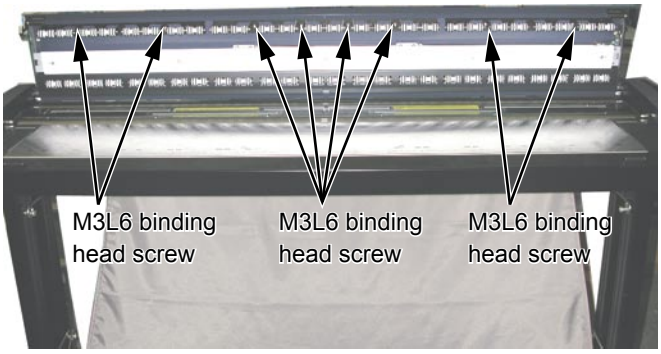
Detaching the front pinch roller units

(1) Remove the two M3L6 binding head screws holding both sides of the front pinch roller cover.



(2) Detach the front pinch roller cover from the center cover assembly.

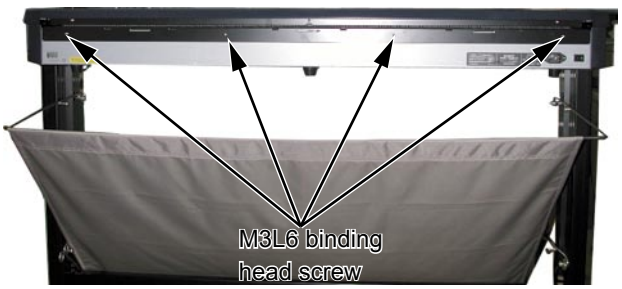
(3) Remove the two M3L6 binding head screws holding the four pinch rollers unit assembly.



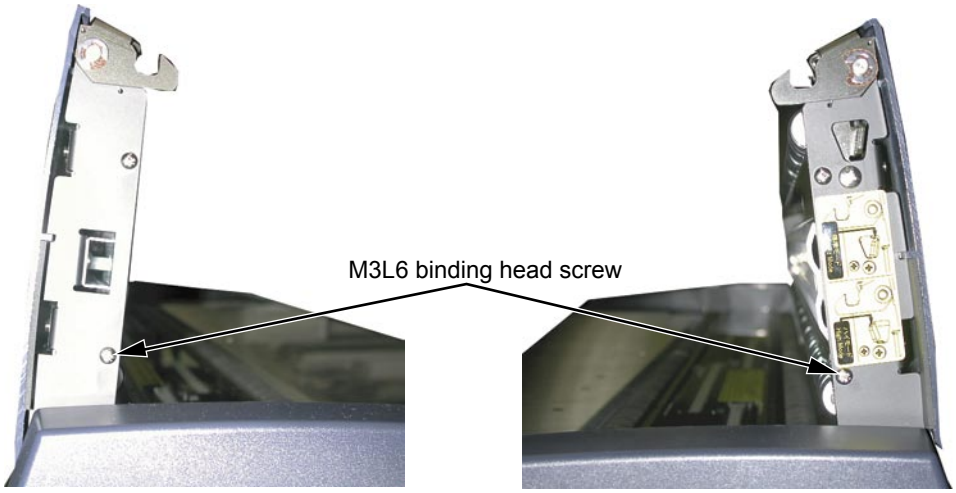
(4) Remove the four M3L6 binding head screws holding the five pinch rollers unit assembly.

Detaching the rear pinch roller units

(1) Remove the four M3L6 binding head screws holding the rear of the rear pinch roller cover.

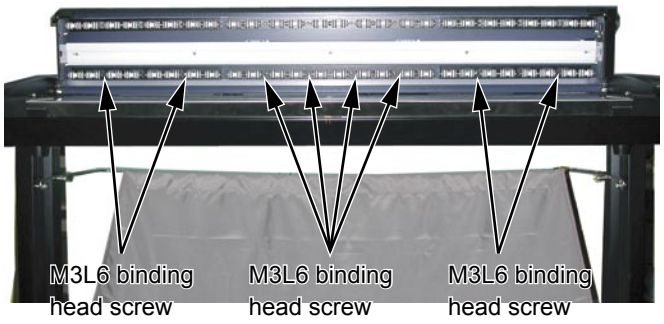


(2) Remove the two M3L6 binding head screws holding both sides of the rear pinch roller cover.



(3) Detach the rear pinch roller cover from the center cover assembly.

(4) Remove the two M3L6 binding head screws holding the four pinch rollers unit assembly.



(5) Remove the four M3L6 binding head screws holding the five pinch rollers unit assembly.

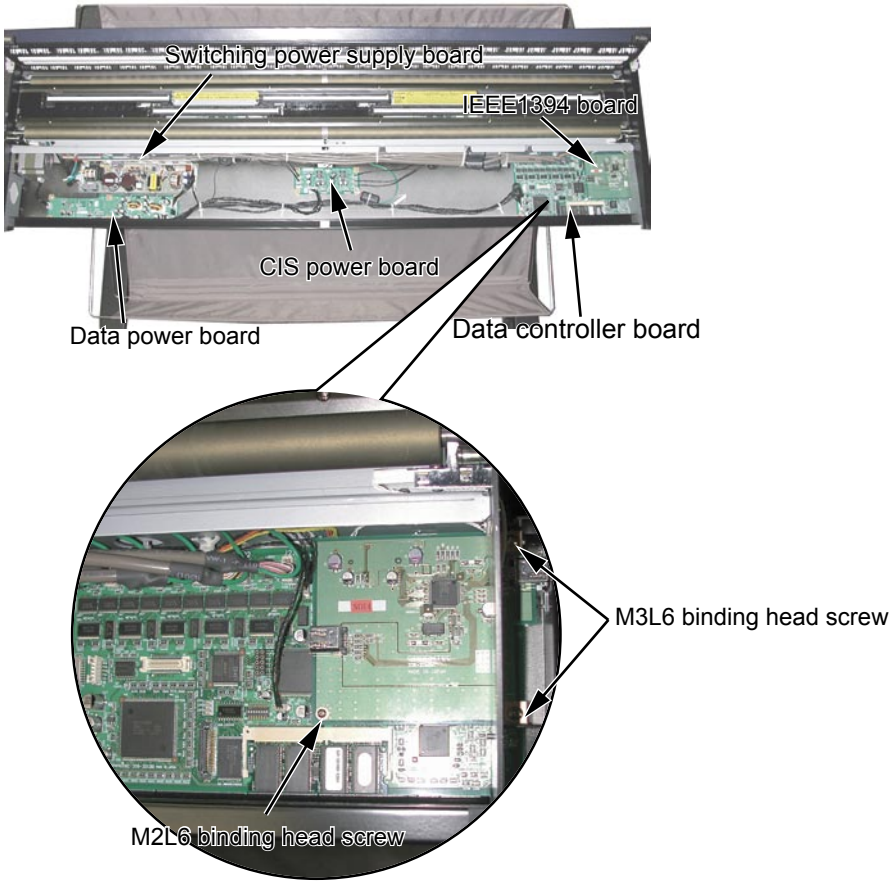
Reattaching the pinch roller units

(1) Reattach the pinch roller units in the reverse order in which they were detached.

8.19 IEEE 1394 Board

Detaching the IEEE 1394 board

(1) Detach the right and left side covers (see Sections 8.1 and 8.2).
(2) Detach the front guide assembly (see Section 8.4).
(3) Remove the two M3L6 binding head screws and the one M2L6 binding head screw holding the IEEE 1394 board.



(4) Detach the IEEE 1394 board from the data controller board.

Reattaching the IEEE 1394 board

(1) Reattach the IEEE 1394 board in the reverse order in which it was detached.
(2) When replacing the IEEE 1394 board, perform the software adjustment to input the MAC address for the IEEE 1394 board (See "Replacing the IEEE 1394 board" in Section 9.3).

8.20 Data Controller Board

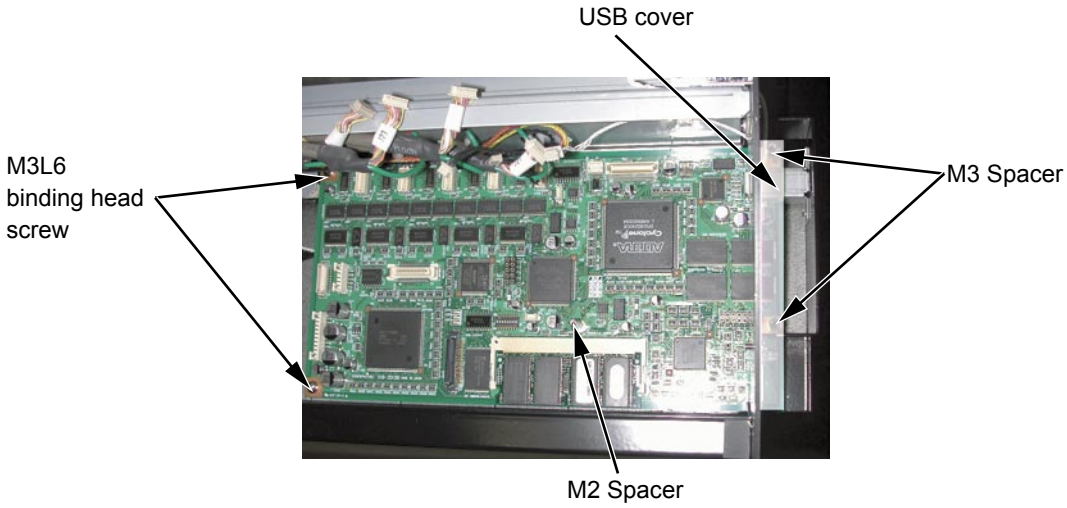
⚠CAUTION

When replacing the data controller board, perform the software adjustment to obtain the former setting values from the data controller board.

Detaching the data controller board

(1) Detach the right and left side covers (see Sections 8.1 and 8.2).
(2) Detach the front guide assembly (see Section 8.4).
(3) Detach the IEEE 1394 board (see Section 8.19).
(4) Remove the two M3L6 flat head screws holding the USB cover and then detach the USB cover from the unit.

(5) Disconnect all the connectors on the data controller board and remove the two M3L6 binding head screws, the one M2 spacer and the two M3 spacers holding the data control board.



(6) Detach the data controller board from the unit.

Reattaching the data controller board

(1) Reattach the data controller board in the reverse order in which it was detached.
(2) Set the DIP switch setting for each model (See "Replacing the Data Controller Board" in Section 9.2).
(3) Perform the software adjustment to input the former setting values or adjust the scanner by software adjustment. (See "Preparations before Making Adjustment" in Section 10.2)
(4) When replacing the data controller board, write down the MAC address that is shown on the old data controller board on the new data controller board.

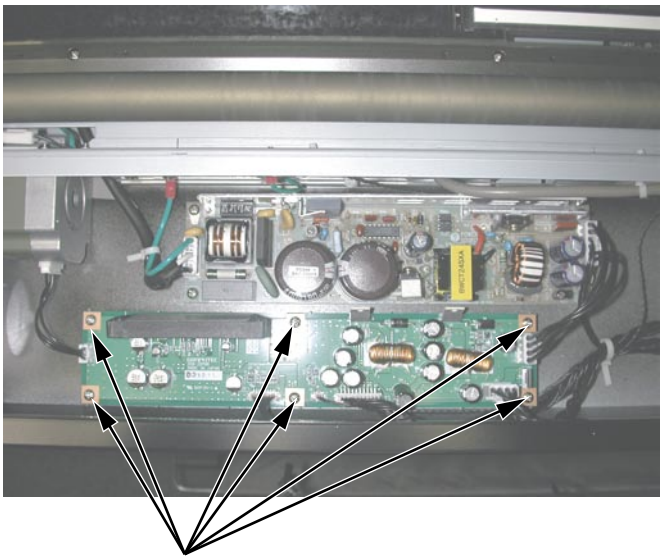
⚠CAUTION

When replacing the data controller board, perform the software adjustment to obtain the former setting values from data controller board. (See "Preparations before Making Adjustment" in Section 10.2)

8.21 Data Power Board

Detaching the data power board

(1) Detach the right and left side covers (see Sections 8.1 and 8.2).
(2) Detach the front guide assembly (see Section 8.4).
(3) Remove the six M3L6 binding head screws holding the data power board.



(4) Disconnect all the connectors on the data power board.
(5) Detach the data power board from the unit.

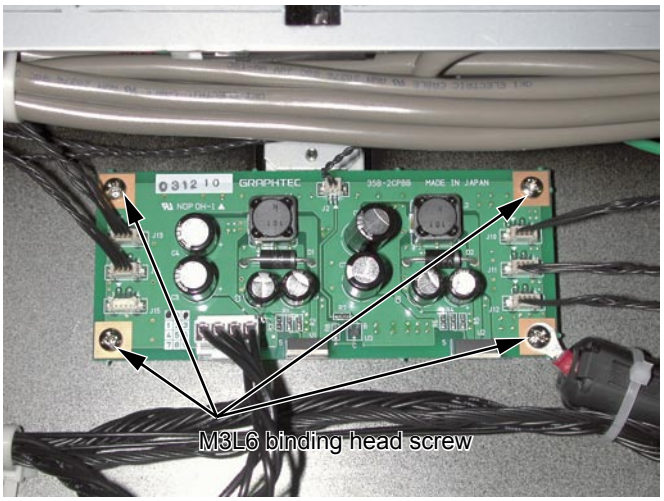
Reattaching the data power board

(1) Reattach the data power board in the reverse order in which it was detached.

8.22 CIS Power Board

Detaching the CIS power board

(1) Detach the right and left side covers (see Sections 8.1 and 8.2).
(2) Detach the front guide assembly (see Section 8.4).
(3) Remove the four M3L6 binding head screws holding the CIS power board.



(4) Disconnect all the connectors on the CIS power board.
(5) Detach the CIS power board from the unit.

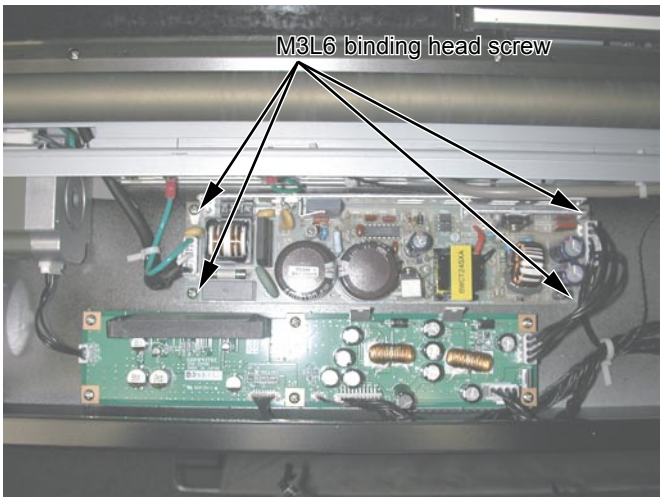
Reattaching the CIS power board

(1) Reattach the CIS power board in the reverse order in which it was detached.
(2) Adjust the output voltage to 5.45V ±0.02V between pins 3 and 4 of J10 using VR1 on the CIS power board when you replace any of the boards.

8.23 Switching Power Supply Board

Detaching the switching power supply board

(1) Detach the right and left side covers (see Sections 8.1 and 8.2).
(2) Detach the front guide assembly (see Section 8.4).
(3) Remove the four M3L6 binding head screws holding the switching power supply board.



(4) Disconnect all the connectors on the switching power supply board.
(5) Detach the switching power supply board from the unit.

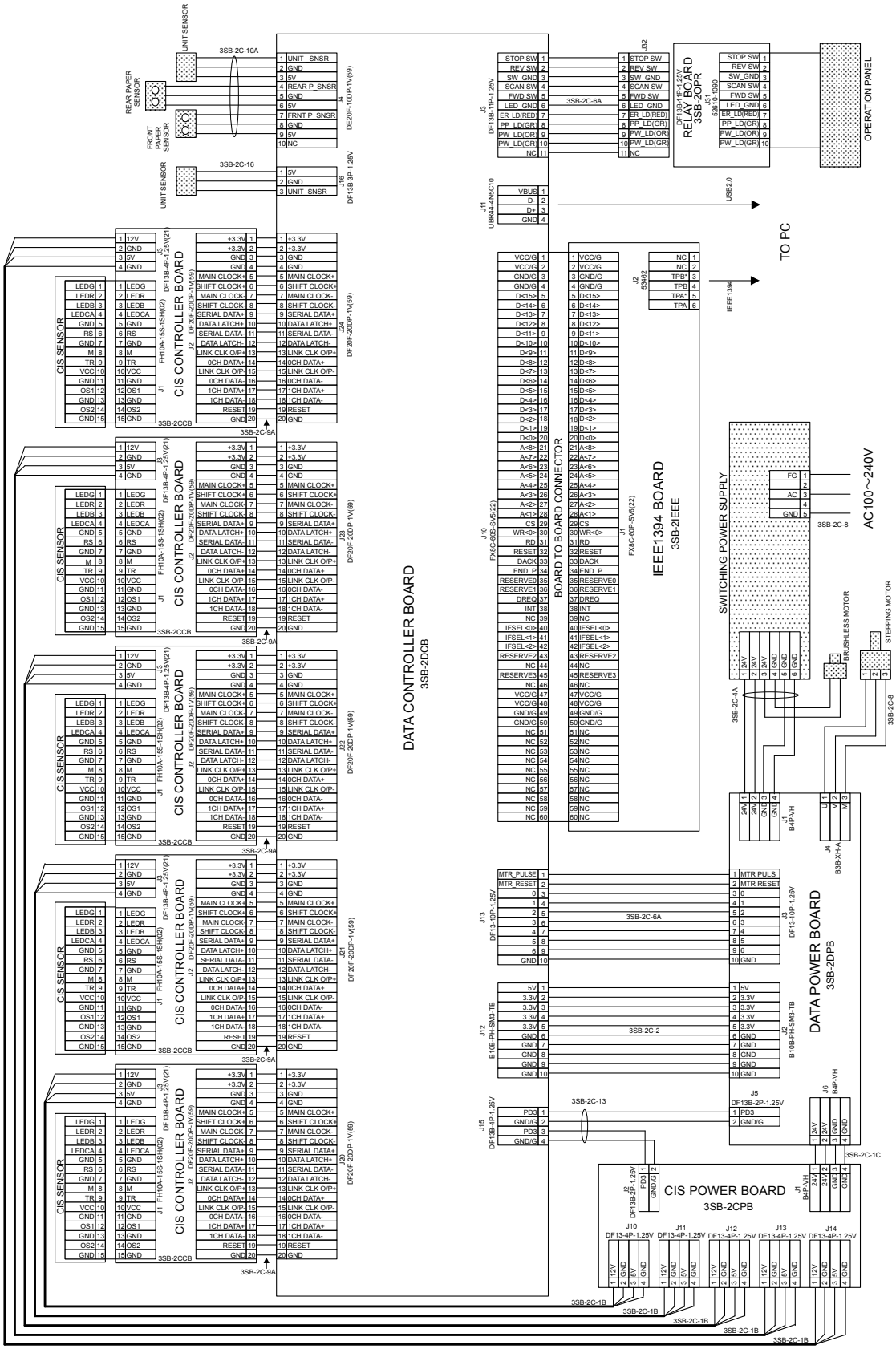
Reattaching the data power board

(1) Reattach the switching power supply board in the reverse order in which it was detached.

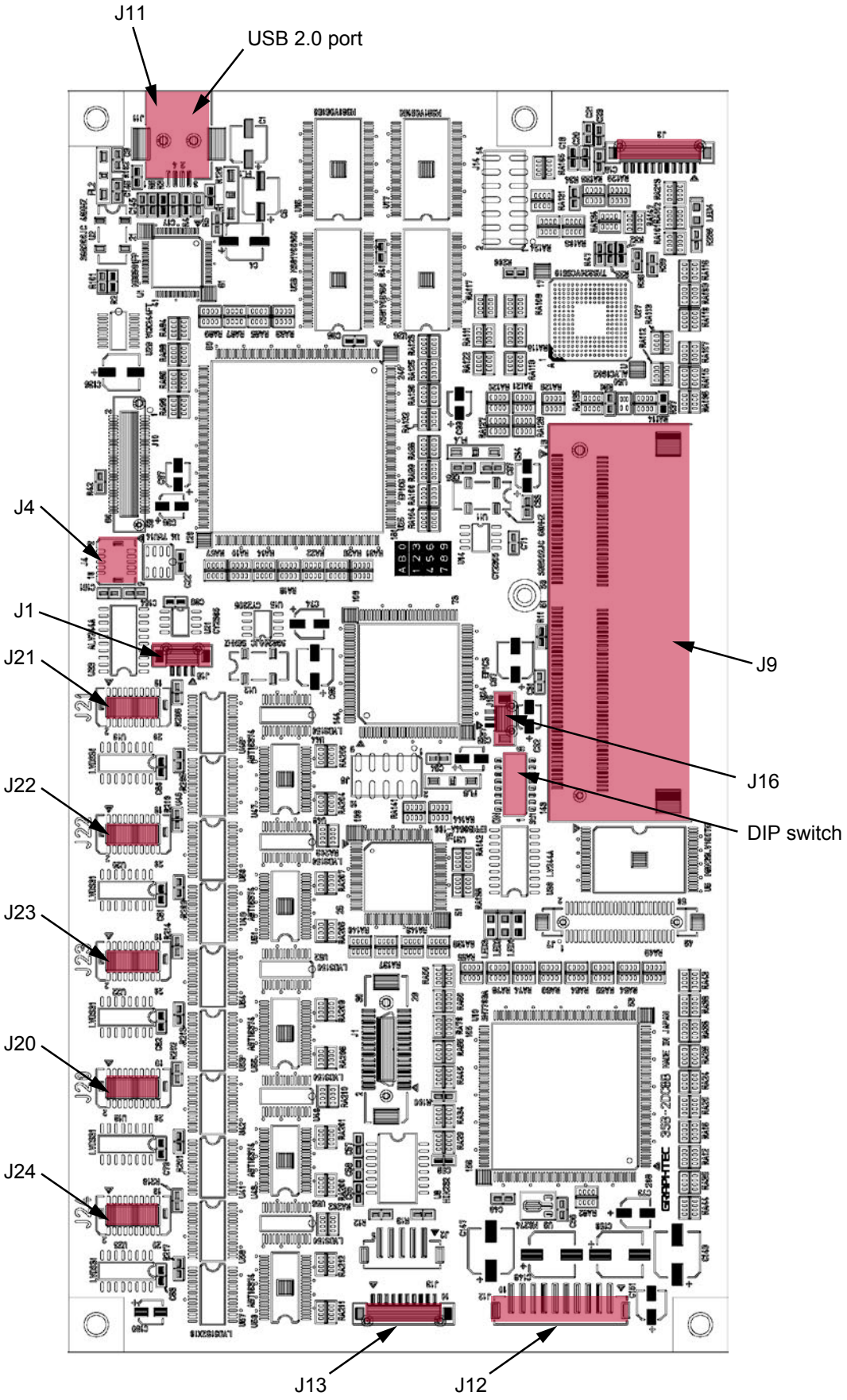
9. BOARDS AND ELECTRICAL COMPONENTS

9.1 Wiring Diagrams

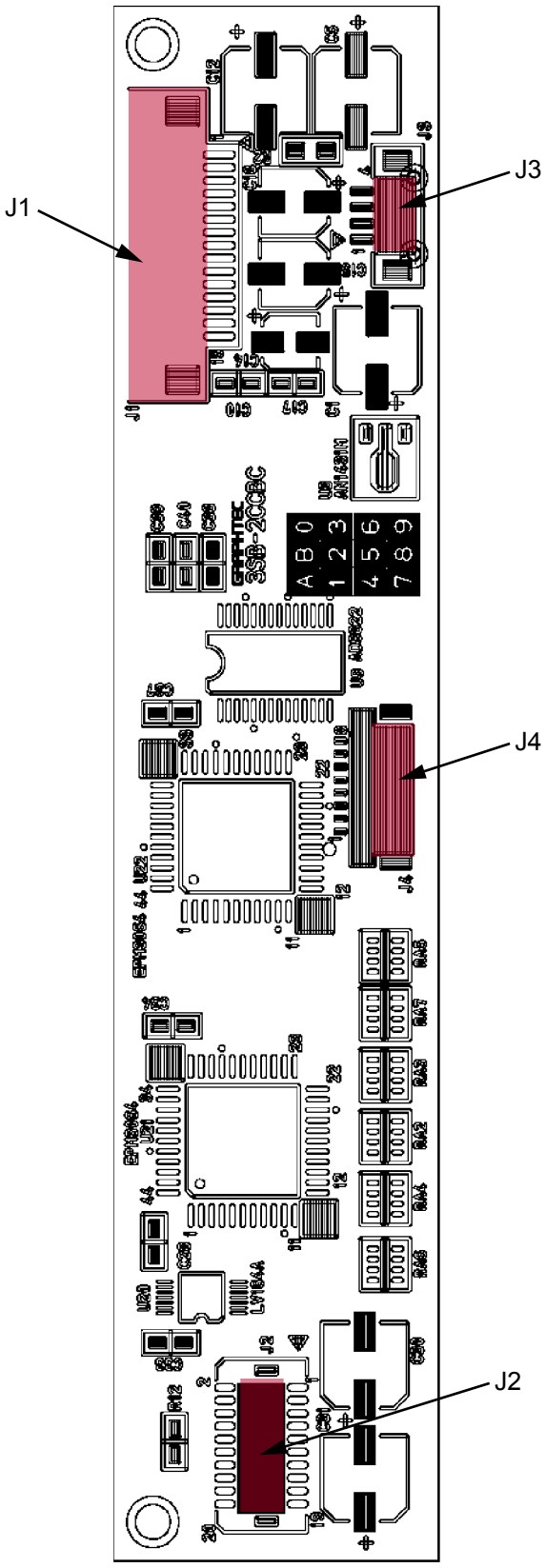
Overall Configuration



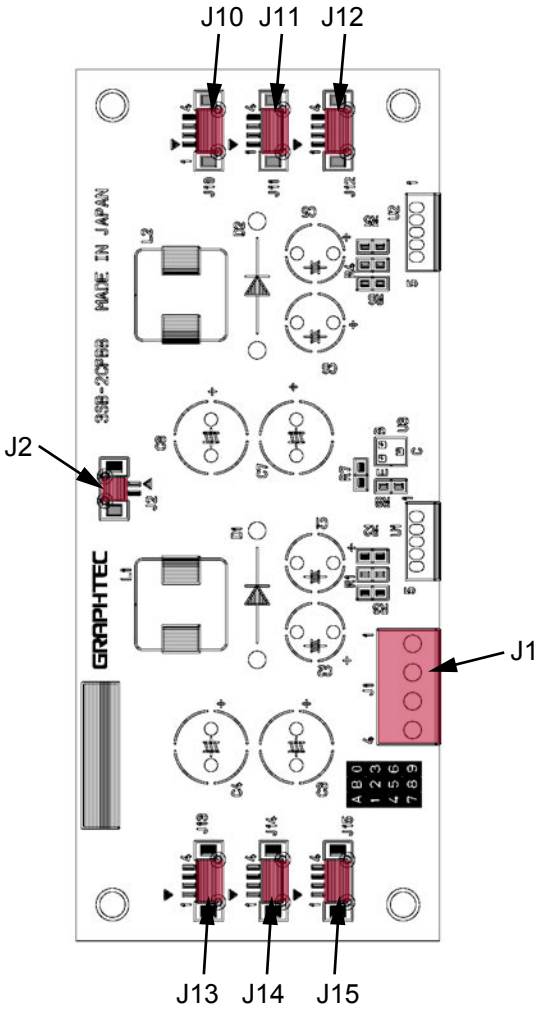
Component Layout on the Data Controller Board



Component Layout on the CIS Controller Board

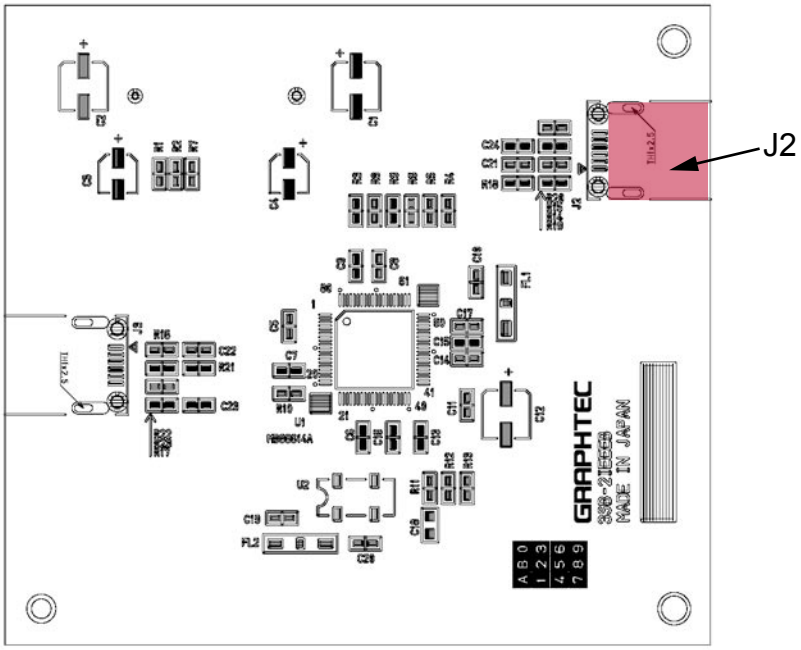


Component Layout on the Data Power Board

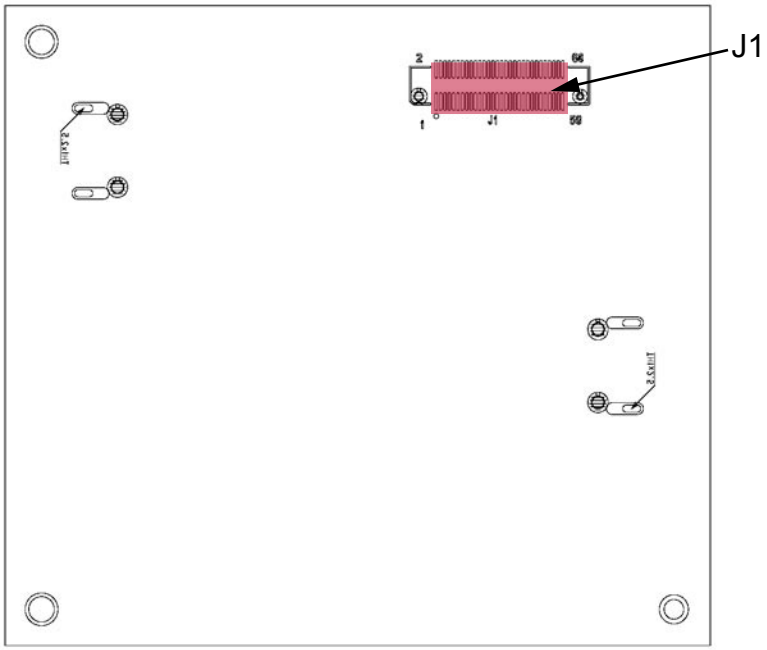


Component Layout on the IEEE 1394 Board

Upper side



Reverse side



9.2 Replacing the Data Controller Board

1. Precautions for replacing the data controller board

(1) Before replacing the data controller board, note the feed correction value, X overlap and Y offset values currently selected for the scanner, if these values can be checked. (To check these values, follow the procedure given in "Preparations before Making Adjustments" in Section 10.2.)
(2) Use Scanning Master 21+ to make adjustments.

2. Replacing the data controller board

(1) Before replacing the data controller board, note the feed correction value, X overlap and Y offset values currently selected for the scanner, if these values can be checked. (To check these values, follow the steps given in "Preparations before Making Adjustments" in Section 10.2.
(2) Detach the data controller board (See "Data Controller Board" in Section 8.20).
(3) Write down the MAC address that is shown on the old data controller board on the new data controller board.
(4) Attach the new data controller board by reversing the sequence of steps in which the old board was removed.
(5) Set the DIP switch for each model as shown in the table below.

Bit No.	Function
1	Not used
2	
3	Debug Mode (Not used for servicing purposes)
4	Not used
5	
6	Model setting
7	
8	

Model	Bit 6	Bit 7	Bit 8
CS400-10	OFF	OFF	OFF
CS400-06	OFF	OFF	ON
CS300-10	OFF	ON	OFF
N/A	OFF	ON	ON
N/A	ON	OFF	OFF
N/A	ON	OFF	ON
N/A	ON	ON	OFF
N/A	ON	ON	ON

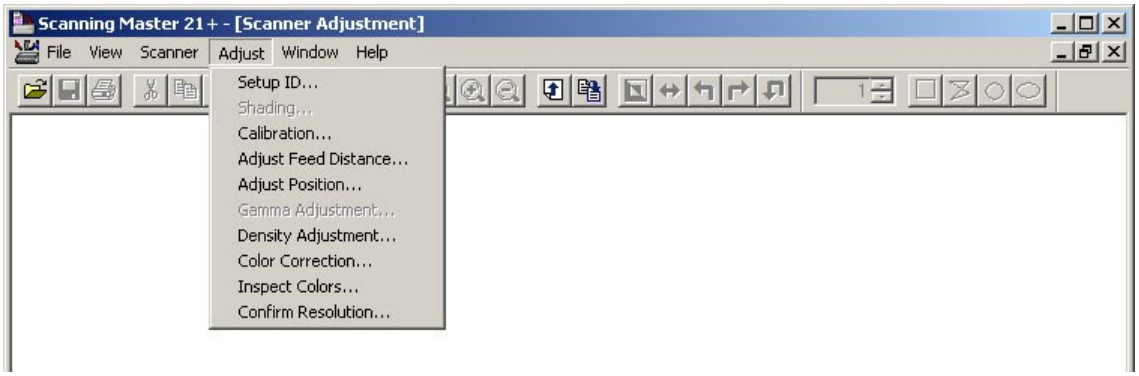
(6) Initialize all adjustments by turning ON the power while pressing down and holding the STOP and SCAN keys.
(7) Perform Calibration (white correction). (See "Calibration (white correction)" on p. 10-5.)
(8) Adjust the feed distance. (See "Adjusting feed distance" on p. 10-7.)
(9) Adjust the offset (origin). (See "Adjusting offset (origin)" on p. 10-9.)
(10) Align the sensor images (X overlap, Y offset). (See "Sensor joint alignment" on p. 10-12.)
(11) Perform Color correction (using a color correction sheet). (See "Color correction" on p. 10-15.)

9.3 Replacing the IEEE 1394 Board

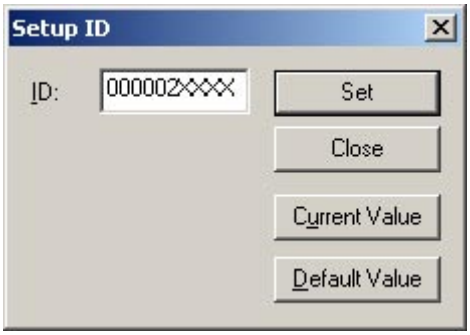
(1) After replacing the IEEE 1394 board, you need to input the MAC address to the IEEE 1394 board.
(2) Use Scanning Master 21+ to input the MAC address.

Input the MAC address to the IEEE 1394 board

(1) Use the IEEE 1394 cable to connect the CS400/300 and PC. (Disconnect the USB cable from the scanner at this time.)
(2) Turn on the power for your PC and start OPS112.
(3) When OPS112 starts, follow the steps given below to input the MAC address.
   1. Access the "Help" menu and select "About." At this time, a dialog box will appear.
   2. Point to the icon in the window and click while pressing and holding the "Ctrl" key.
   3. Click the "OK" button while pressing and holding down the "Shift" key. This makes the status available for adjustment.
   4. Select "Setup ID" from the "Adjust" menu to display the Adjust Scanner window.



   5. The following dialog box appears. Input the 10-digit MAC address shown on the data controller board.



   6. Click the "Set" button to register the MAC address.
   7. Click the "Close" button to end the adjustment mode.

9.4 Downloading Firmware

This section describes how to download firmware (system programs) via the USB interface to the flash memory provided on the data controller board, to which the boot program has been downloaded.

1. Items required to download firmware

- argos.X file (Firmware)
- CS400/300 scanner
- PC (Windows 2000/XP and an operating environment that provides USB 2.0 compatibility)
- OPS112 (Scanning Master 21+ Ver 4.40 or later)
- USB interface cable

2. Procedure

(1) Use the USB cable to connect the CS400/300 and PC.
(2) Turn on the power while pressing and holding down the STOP key, the REVERSE key and the FORWARD key until the green and orange LED come on the power LED.
(3) Turn on the power for your PC and start OPS112.
(4) When OPS112 starts, follow the steps given below to download the firmware.
    1. Access the "Help" menu and select "About." At this time, a dialog box will appear.
    2. Point to the icon in the window and click while pressing and holding down the "Ctrl" key.
    3. Click the "OK" button while pressing and holding down the "Shift" key.
       This makes the status available for adjustment.
    4. Select "Adjust Scanner" from the "Tools" menu to display the Adjust Scanner window.
    5. Select "Update Scanner/Firmware" from the "Scan" menu to display the Download dialog box.
(5) Insert the floppy disk containing the firmware (filename: argos.X) into the floppy disk drive, click the "View" button on the Download dialog box, select the floppy disk, and click the "OK" button.
(6) Click the "Start" button to begin downloading.
(7) After the download is complete, a message will appear. At this time, the paper and error LEDs on the scanner should start flashing simultaneously.
    After confirming this, turn off the power.

10. ADJUSTMENTS USING THE SOFTWARE

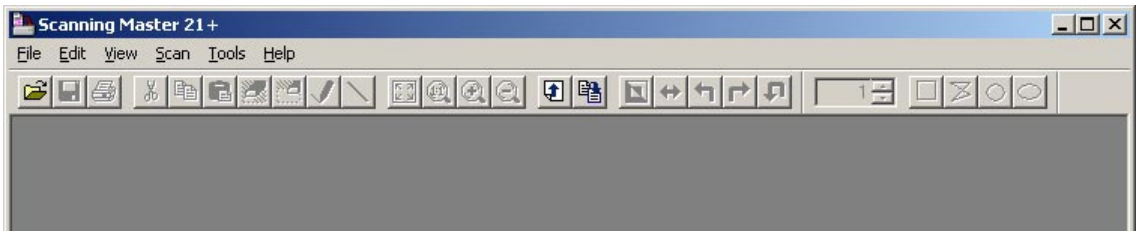
10.1 Starting the Software

• Ensure that OPS112 (Scanning Master 21+ Ver 4.40 or later) is installed.

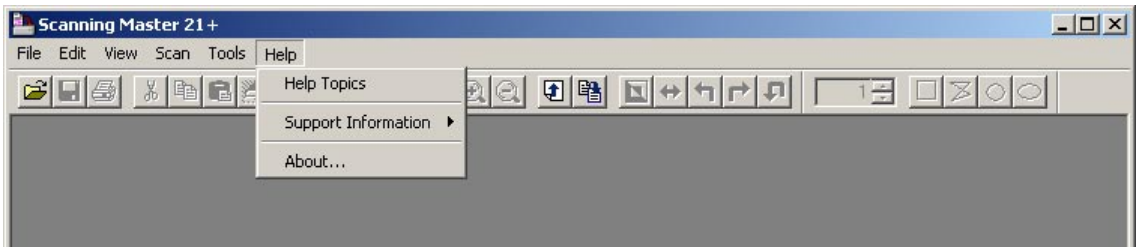
(1) Connect the scanner to the PC using a USB cable and switch on the scanner.

(2) Start Windows (OS).

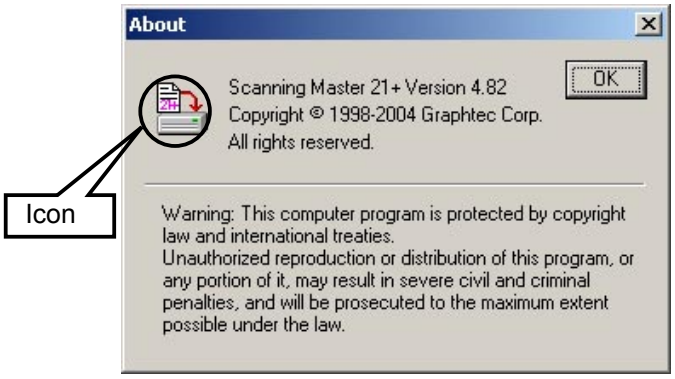
(3) Start OPS112 (SCANNING MASTER 21+).



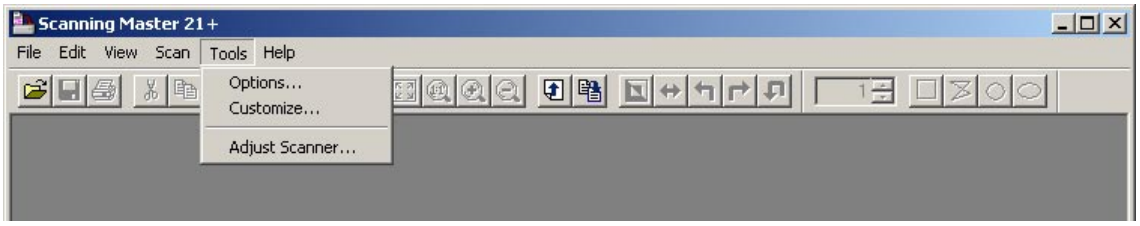
(4) Select "About" from the "Help" menu.



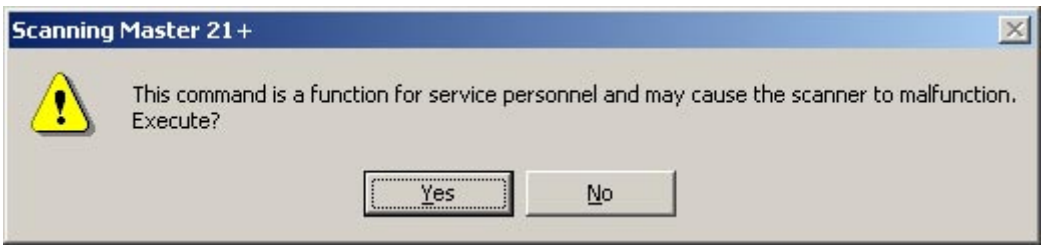
(5) Click the scanner icon while pressing and holding the "Ctrl" key.
Next, click the "OK" button while pressing and holding the "Shift" key.


About
Scanning Master 21+ Version 4.82
Copyright © 1998-2004 Graphtec Corp.
All rights reserved.
OK
Warning: This computer program is protected by copyright law and international treaties.
Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.
Icon

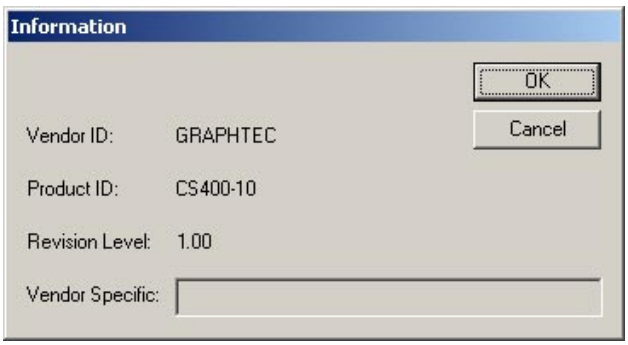
(6) Select "Adjust Scanner" from the "Tools" menu.

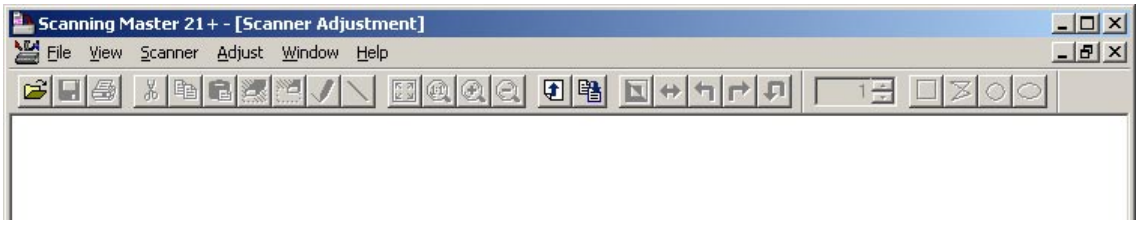


(7) Select "Yes".


Scanning Master 21+
This command is a function for service personnel and may cause the scanner to malfunction.
Execute?
Yes
No

(8) When you click the "OK" button in the following windows, the Adjust Scanner window will appear with the Adjust menu.





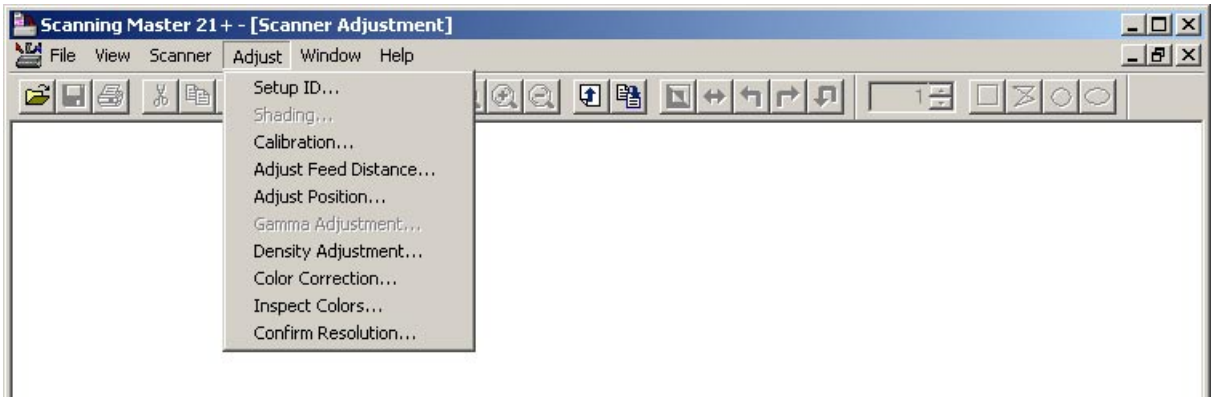
10.2 Preparations before Making Adjustments

Note the current feed distance adjustment and position adjustment values while making adjustments.
This enables the values to be entered directly from the keyboard to restore the scanner to its previous status if adjustment fails.
In main board replacement, the time required for adjustment can be reduced by setting the previously noted feed distance adjustment and position adjustment values. However, for image sensor unit replacement, all settings must be adjusted, eliminating the need to record the previous values.

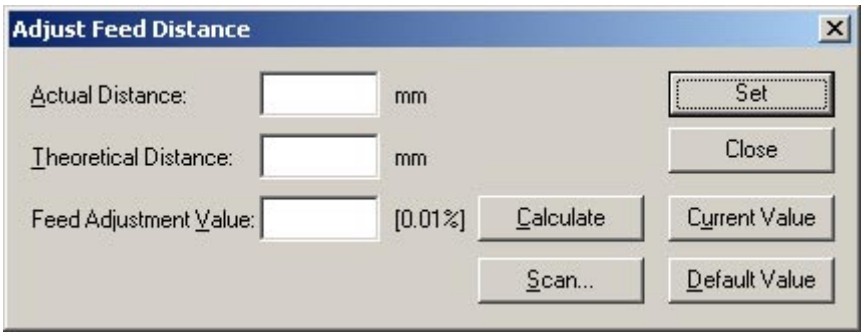
Adjustment Procedure

(1) Start Scanning Master 21+. (See p. 10-1.)

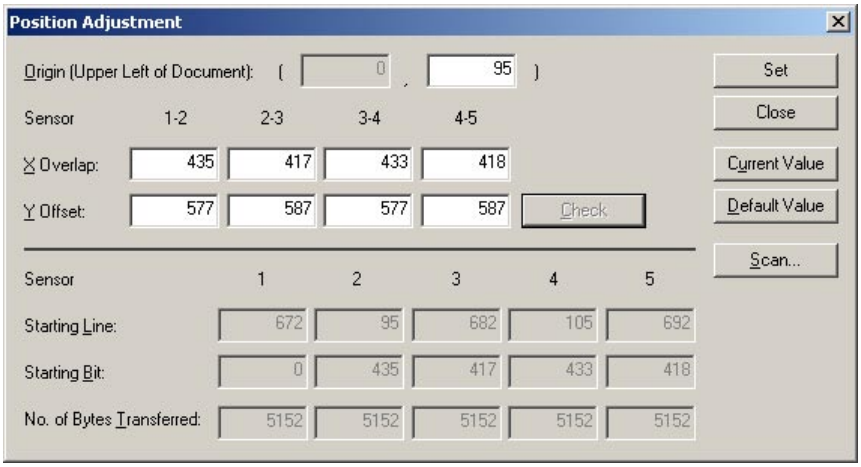
(2) Select "Adjust Feed Distance" from the "Adjust" menu.



(3) Click the "Current Value" button and note the value shown in the Feed box. After finishing, click the "Close" button.



(4) Similarly, select "Adjust Position" from the "Adjust" menu and click the "Current Value" button. Note the values shown in the X Overlap and Y Offset boxes and click the "Close" button.


Position Adjustment
Origin (Upper Left of Document): (0 , 95)
Set
Sensor 1-2 2-3 3-4 4-5
Close
X Overlap: 435 417 433 418
Current Value
Y Offset: 577 587 577 587
Check
Default Value
Scan...
Sensor 1 2 3 4 5
Starting Line: 672 95 682 105 692
Starting Bit: 0 435 417 433 418
No. of Bytes Transferred: 5152 5152 5152 5152 5152

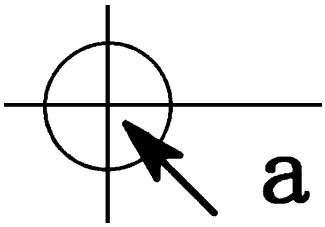
10.3 Preparing a Test Chart

(1) Prepare a CS1000 adjustment test chart.

(2) Make sure that the distances (measured with a glass scale) between the two points in all pairs are included in the chart in advance. (See the chart shown above.)

<<Tip 1>> Test chart is made of Mylar paper.
For use in normal office environments (normal temperatures and humidity levels), you should only need to measure each distance once.
Make sure that each distance is measured with the utmost accuracy.

<<Tip 2>> Make sure that all staff members using this test chart select the same measurement points.
This chart has been designed with the assumption that the point shown below is used for measurement.



<<Tip 3>> If the user-specified paper must be used for adjustments, you should make the measurements over as long a period of time as possible to obtain good results.

10.4 Making Adjustments

Always follow the sequence given below when making adjustments.

1. Calibration (white correction)

2. Feed distance adjustment

3. Position adjustment

Offset adjustment

Sensor joint alignment

4. Color correction

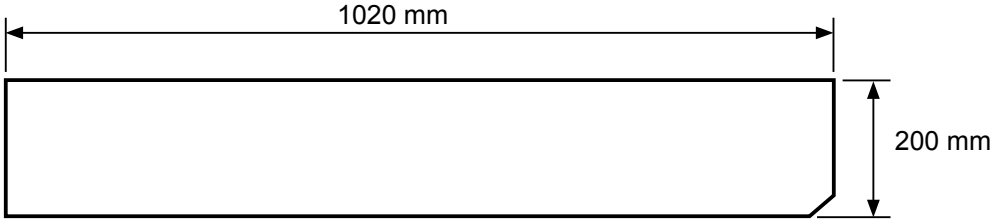
Scanner Calibration

CHECKPOINT

Before beginning calibration, clean the scanner glass and scanner table surface. Any dust or dirt on this surface may affect calibration results and resulting image quality.
Check that the calibration sheet is free of any dust or dirt.

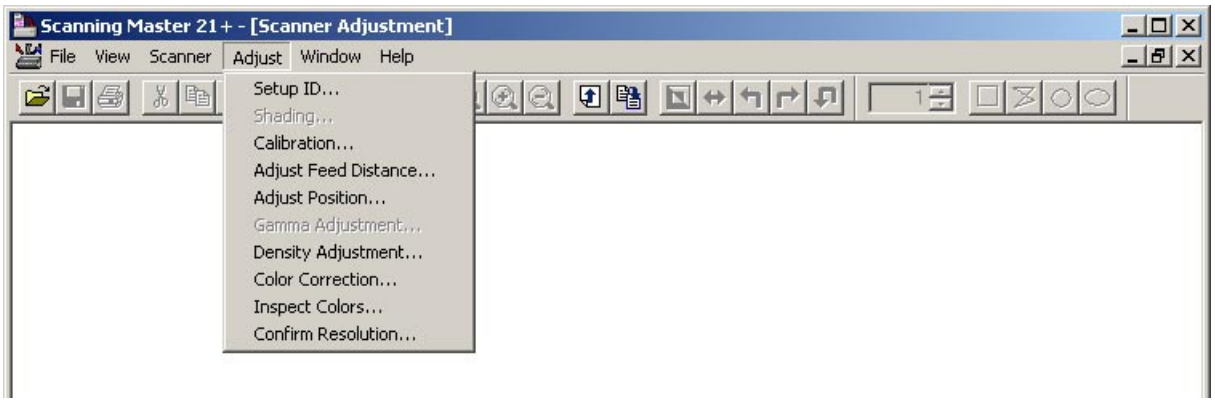
1. Calibration (white correction)

(1) Connect the scanner to the computer. Switch on the scanner, then switch on the PC.
(2) Start Scanning Master 21+. (See p. 10-1.)
(3) Remove the white calibration sheet (200 x 1050 mm) from its special storage box.
Clean the sensor glass surface and the document hold-down unit.
Set the document hold-down unit force setting to "High".

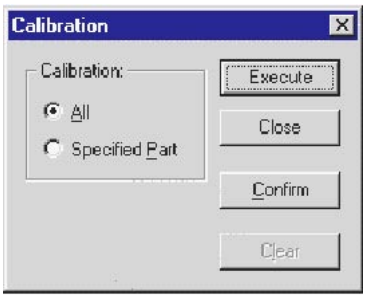


Calibration sheet

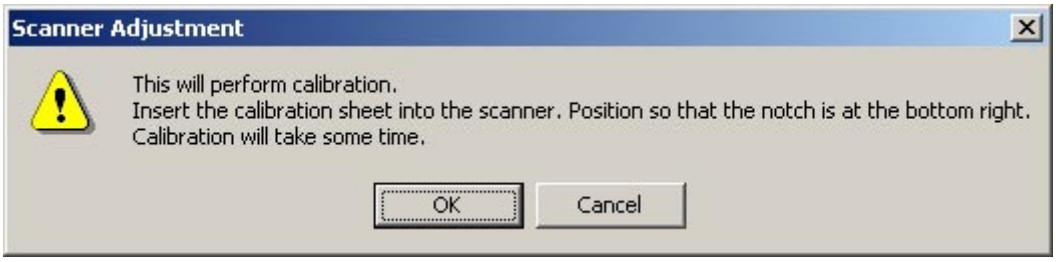
(4) Select "Calibration" from the "Adjust" menu.



(5) Select All in Calibration and click the Execute button.



(6) The following message is displayed. Insert the calibration sheet into the scanner as instructed.


Scanner Adjustment
This will perform calibration.
Insert the calibration sheet into the scanner. Position so that the notch is at the bottom right.
Calibration will take some time.
OK
Cancel

(7) Click the OK button to start scanning.
The scanned data is displayed when scanning is complete. Colors may differ slightly for individual sensors to make it easier to identify problem areas in calibration. This does not indicate a defect.
Check that there are no vertical streaks, such as white patches, in the scanned data.
(Streaks occur when calibration is not performed correctly due to contamination by dust or dirt.)

(8) If the data is normal, calibration is complete.
Click the Close button and exit calibration mode.

(9) If any abnormal data is observed, specify the problem areas as follows:
Select Specified Part in Calibration.

(10) The mouse arrow cursor changes to a cross cursor when moved over the data. Click the left mouse button with the mouse positioned over the streak data. The selected area is shown in blue. Repeat this procedure for any additional streaks.
Areas that have been selected (shown in blue) can be deselected by clicking the left mouse button again. To deselect all selected areas, click the Clear button.

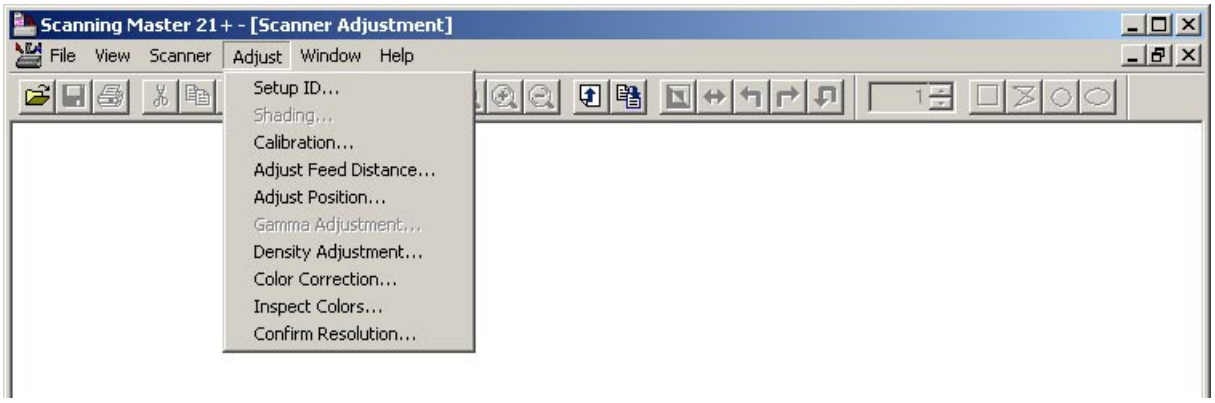
(11) Once all required areas have been specified, remove the calibration sheet and clean the glass and table surfaces. Check the calibration sheet for dust and dirt, then click the Execute button.

(12) Return to step (5) and verify the calibration results.

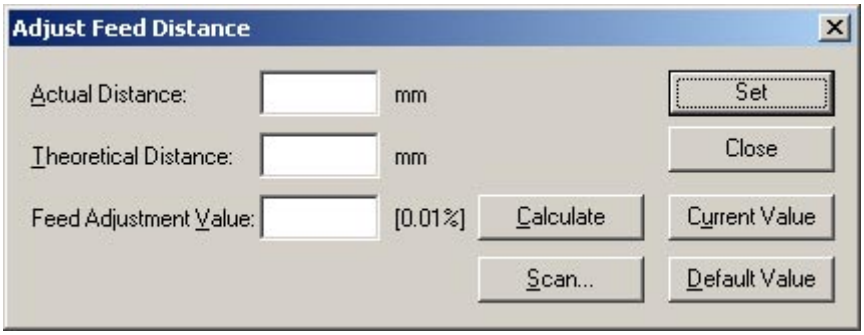
2. Feed distance adjustment

(1) Start the software. (See p. 10-1)

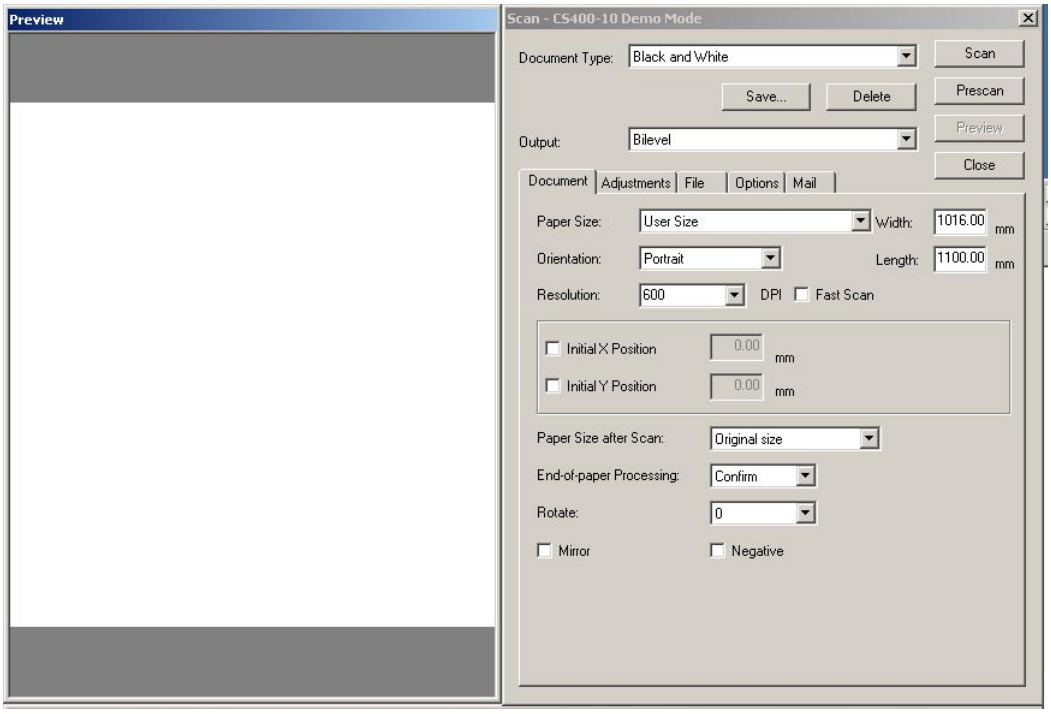
(2) Select "Adjust Feed Distance" from the "Adjust" menu.



(3) The following dialog box will appear: Correctly position the CS1000 test chart on the scanner and click the "Scan" button.



(4) The following dialog box will appear: Click the "Scan" button.



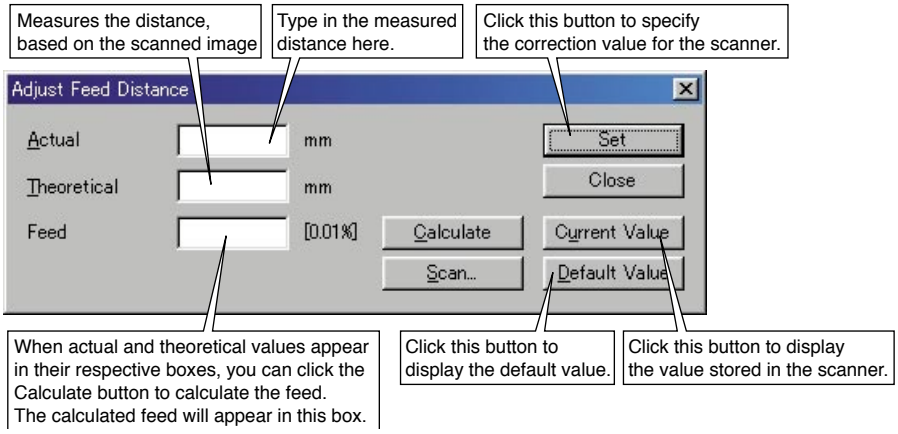
Select the following for "Document Info" and "Scan Settings":

"Document Info" Paper Size: User Size, Width: 1016, Length 1100, Resolution: 600 dpi

Document Type: Black and White

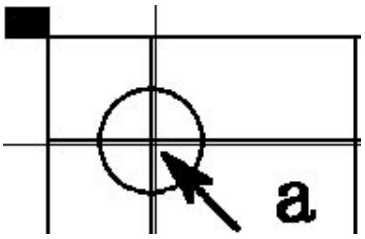
"Scan Settings" Output: Bilevel, Intensity: 115, Intensity Correction: 0, Edge Adjustment: 0

The following dialog box appears, together with the scanned image.

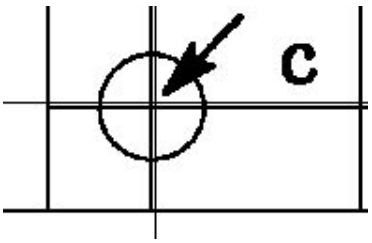

Measures the distance, based on the scanned image
Type in the measured distance here.
Click this button to specify the correction value for the scanner.
Adjust Feed Distance
Actual
mm
Theoretical
mm
Feed
[0.01%]
Calculate
Scan...
Set
Close
Current Value
Default Value
When actual and theoretical values appear in their respective boxes, you can click the Calculate button to calculate the feed. The calculated feed will appear in this box.
Click this button to display the default value.
Click this button to display the value stored in the scanner.

(5) Type the distance between a and c measured with a glass scale in the "Actual" box.

(6) Click anywhere within the "Theoretical" box and use the crosshairs cursor to click the white corner indicated by arrow "a" on the scanned image.



(7) Scroll the scanned image to click the white corner indicated by arrow "c" with the crosshairs cursor.



(8) The measured distance appears in the "Theoretical" box. Click the "Calculate" button.

(9) The correction value appears in the "Feed" box.
Click the "Set" button to allow the scanner to store the correction value.

(10) Place the test chart on the scanner again and click the "Scan" button.

(11) Repeat Steps 5 through 7 to perform the following calculations, based on the figures displayed in the dialog box.
[(Theoretical value - Actual value) / Actual value] x 100%
<< Factory setting >> Confirm that this value is within ±0.05.
<< During servicing >> Confirm that this value is within ±0.07.

CHECKPOINT

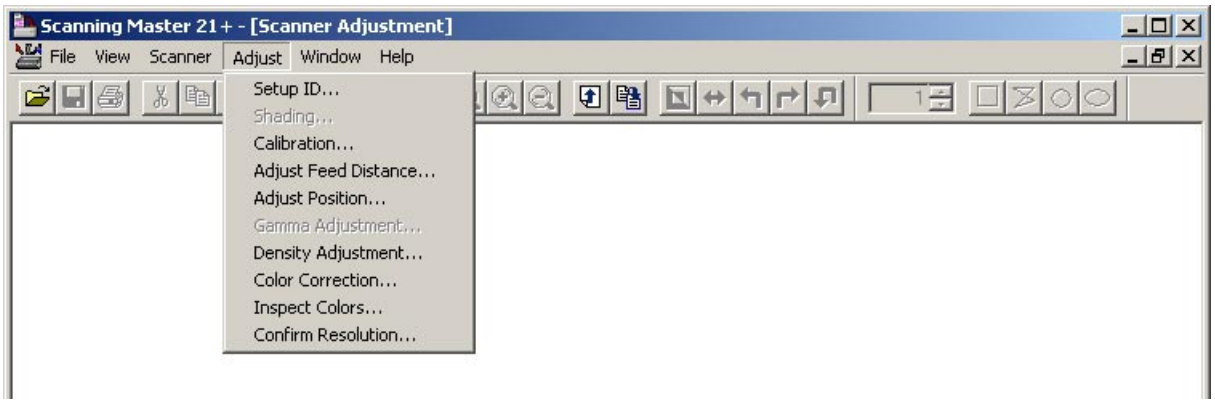
The scanner may be defective if the calculated values do not fall within the above ranges.

3. Position adjustment

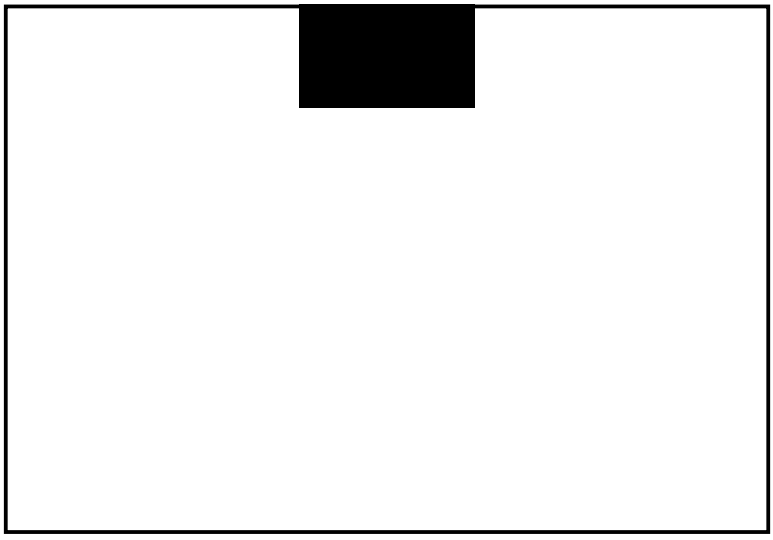
Adjusting offset (origin)

(1) Start the software. (See p. 10-1)

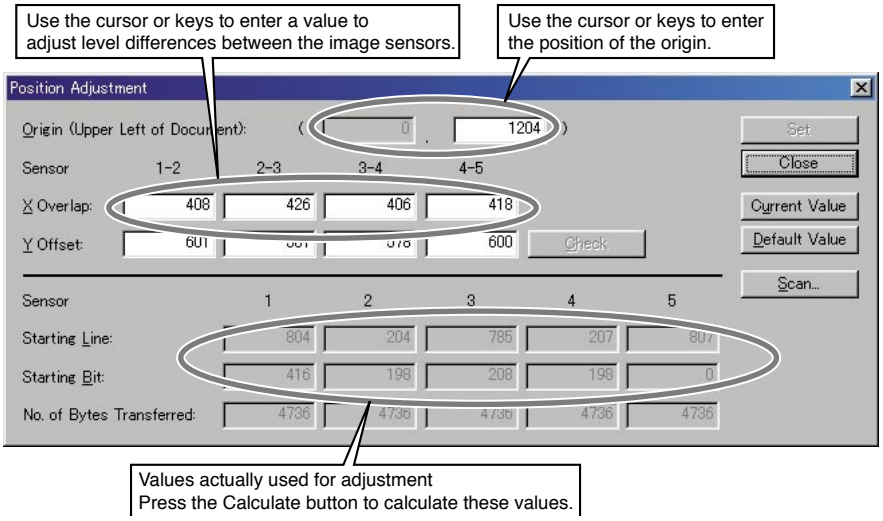
(2) Select "Adjust Position" from the "Adjust" menu.



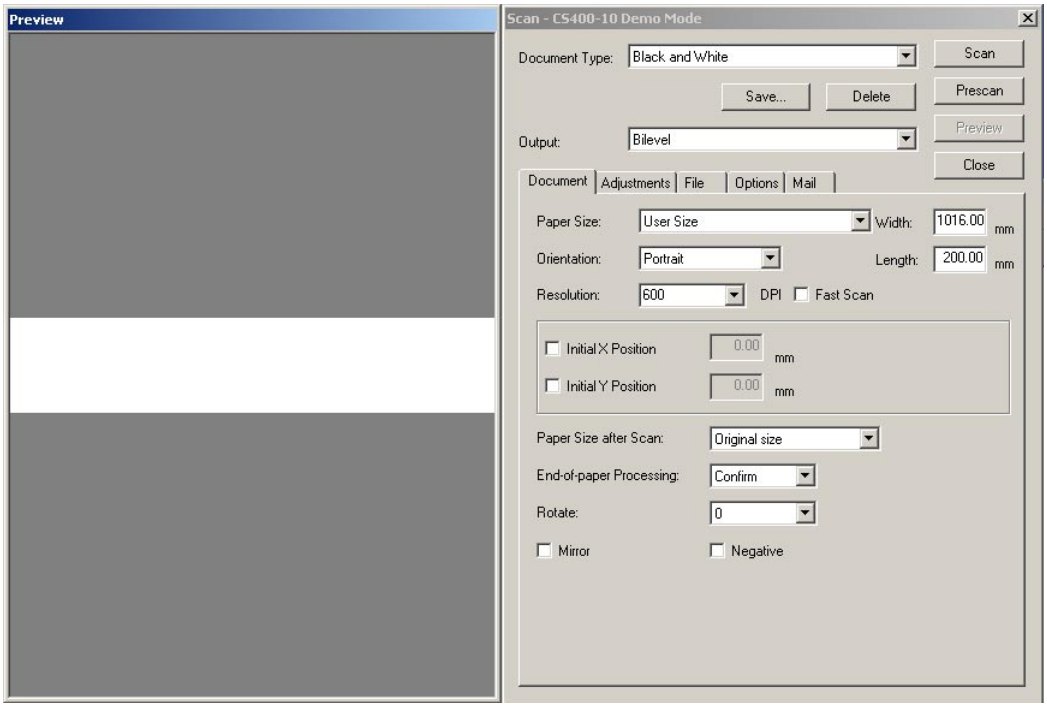
(3) The following dialog box will appear: Correctly position the offset target chart on the scanner and click the "Scan" button.



Offset target chart



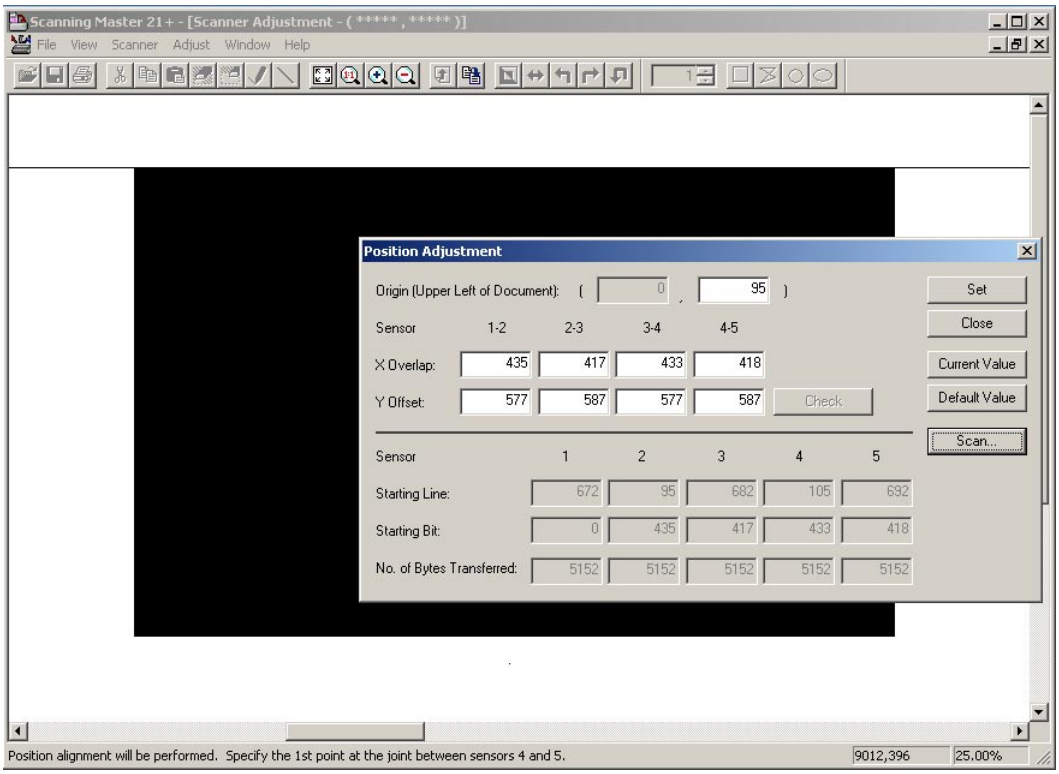
(4) The following dialog box will appear: Click the "Scan" button.



Scan conditions:

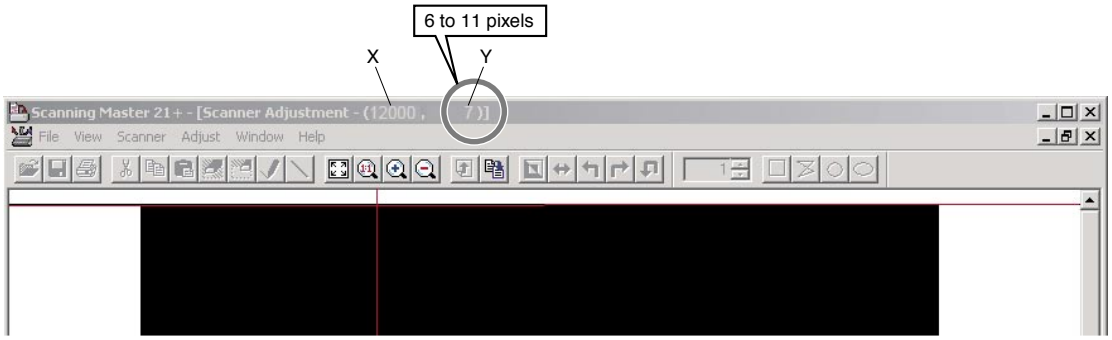
"Document Info" Paper Size: User Size, Width: 1016, Length 200, Resolution: 600 dpi
Document Type: Black and White
"Scan Settings" Output: Bilevel, Intensity: 115, Intensity Correction: 0, Edge Adjustment: 0

(5) A dialog box appears together with the Scanner window, as shown below.
Click anywhere within the Origin box. When the crosshair cursor appears in the Adjust Scanner window, click on the dark rectangle at the top left of the Adjust Scanner window with the crosshair cursor.
Click anywhere within the Origin box and enter the coordinates displayed after subtracting 8.


Scanning Master 21+ - [Scanner Adjustment - (*****, *****)]
File View Scanner Adjust Window Help
Position Adjustment
Origin (Upper Left of Document): (0 , 95)
Set
Close
Sensor 1-2 2-3 3-4 4-5
X Overlap: 435 417 433 418
Current Value
Y Offset: 577 587 577 587
Check
Default Value
Scan...
Sensor 1 2 3 4 5
Starting Line: 672 95 682 105 692
Starting Bit: 0 435 417 433 418
No. of Bytes Transferred: 5152 5152 5152 5152 5152
Position alignment will be performed. Specify the 1st point at the joint between sensors 4 and 5.
9012,396
25.00%

(6) Click the "Check" button, then click the "Set" button. The following dialog box will appear. Click the "OK" button, then press the "▼" button while pressing the "Stop" button. Reposition the CS1000 test chart on the scanner.

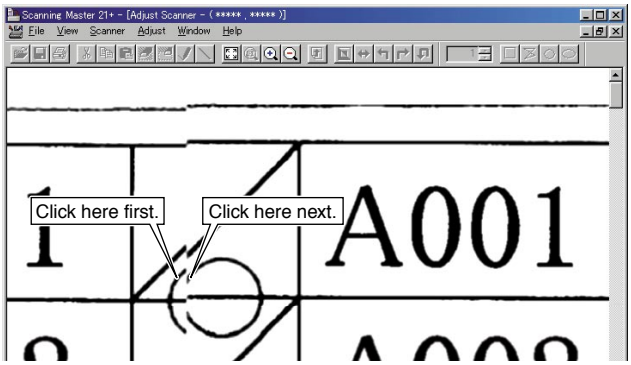
(7) Click the "Scan" button to redisplay the scanned image. Confirm that the dark rectangle is between 6 and 11 pixels from the window edge.



(8) When the scanned image is between 6 and 11 pixels, you may proceed with sensor joint alignment.

Sensor joint alignment (X overlap, Y offset)

(1) When continuing with sensor joint alignment after offset adjustment, scroll the adjusted image to display the portion shown below.
If you start with sensor joint alignment, follow Steps (1) through (4) in "Adjusting offset (origin)" on p. 10-8 to display the scanned image, and scroll to display the portion shown below.



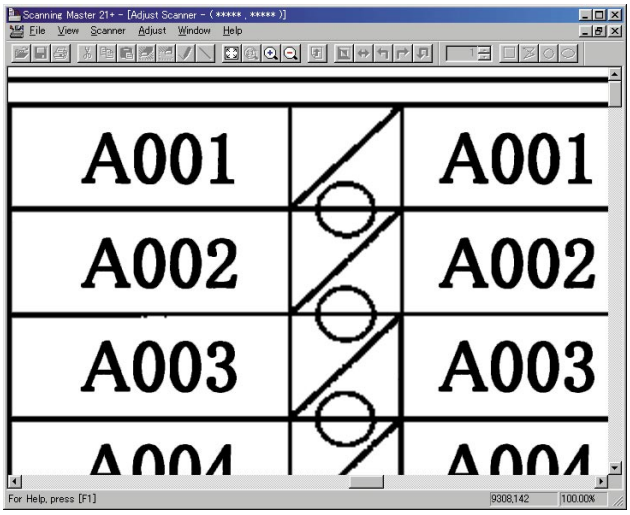
(2) The image appears as shown above, with the left-hand portion of the image misaligned with the right-hand portion. Click anywhere in the X Overlap box under "2-3." The crosshairs cursor will appear. First click a position on the left-hand portion, then click the position of the right-hand portion that corresponds to the position you selected first.

(3) Click the "Check" button first, then click the "Set" button. Follow the on-screen instruction to place the CS1000 test chart on the scanner again.

(4) Repeat these steps until the left-hand portion is properly aligned with the right-hand portion.
In this task, you need to adjust the X overlap and Y offset at the same time.
See "Tips for Making Fine Adjustments" on the next page if you encounter difficulties making fine adjustments.

(5) Similarly, make adjustments for 3-4, 1-2, and 4-5 in this order.
After finishing, close all adjustment menu windows. Use the CS1000 test chart to perform a normal scan, and confirm that the image appears properly.

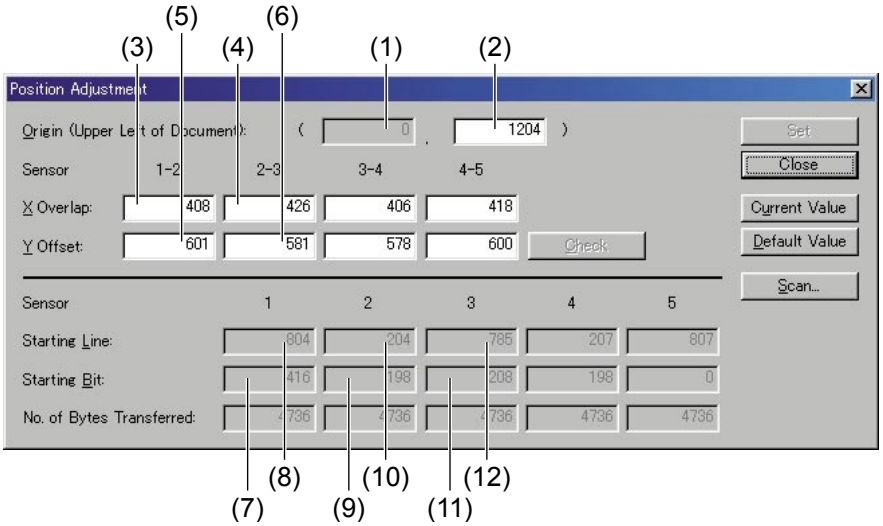
Image after adjustments



Tips for Making Fine Adjustments

• Two portions of the aligned image become misaligned during adjustments using the crosshairs cursor.
• You wish to move a portion of the image by one pixel.
• You find it difficult to find whether any portions of the image are misaligned.
• You feel that some portions of the image remain misaligned, despite efforts to correct the alignment.
In these cases, simply type in numbers to make adjustments.
In this section, we will give you a rough idea of what the numbers in the dialog box mean.
Once you become familiar with the meanings of these numbers and know which numbers to type in, you can make adjustments more accurately and quickly than by using the crosshairs cursor.

Description of the Dialog Box



(1) (2): Origin (Upper left corner of the document)

The upper left corner of the scanner image currently being displayed is always set to (0, 0).
The coordinates increase as you move across and down from this point.

(3) (4): X Overlap

These boxes show the numbers of pixels by which sensor 1 and 2 (2 and 3, 3 and 4, 4 and 5) images overlap. For more overlap, increase these numbers. Reduce these numbers if some portions of images are missing due to excessive overlap to enable accurate fine adjustments.

<<Handy Tip>> Theoretically, distance accuracy in the direction of sensors (in the X direction) cannot be corrected, since it is determined based on the calibration and quality of the individual sensors. However, using the overlaps will make the image appear to be corrected.
In general, use the size change function of the application software to make this adjustment. If your customer requests extreme accuracy and if the size change function does not produce satisfactory results, you may resort to this technique.
In contrast, if the overlaps are not properly adjusted, the product specifications may not be satisfied. Check these values if you receive complaints regarding accuracy in the X direction.

(5) (6): Y Offset

Sensors 1, 3, and 5 are attached 24.5 mm behind sensors 2 and 4 in the direction of the feed.
For this reason, there is always a 24.5 mm difference in the level of the scanned image.
Thus, 24.5 mm/0.0423 mm (1 pixel) = 579 (approx.) appears in these boxes.
In practice, values slightly greater or smaller than the above number will appear due to variations in sensor position and feed.
Keep in mind that with larger values, sensor 1, 3 and 5 images will move farther up.

<<Handy Tip>> Basically, the physical positions of sensors remain unchanged, and sensors are mounted with high accuracy. Therefore, if you find that a Y offset is significantly different from "579", you may conclude that feed accuracy requires adjustment.
Conversely, if you know that the feed accuracy is correct, you may conclude that the sensor physical position is incorrect.
You can use the correction value "579" to adjust the feed so that there is no misalignment in the Y direction. This makes it possible to determine the feed, although this is not completely accurate. You may use this technique for users who do not demand high accuracy.

(7) (9) (11): Starting Line

The distances (numbers of pixels) from the document sensor to each of the image sensors in the direction of document feed are displayed in these boxes.
Subtracting value (9) from values (7) and (11) produces values (5) and (6), respectively.
If you change values (5) and (6) and press the "Check" button, values (9) and (11) will be calculated and changed automatically.

(8) (10) (12): Starting Bit

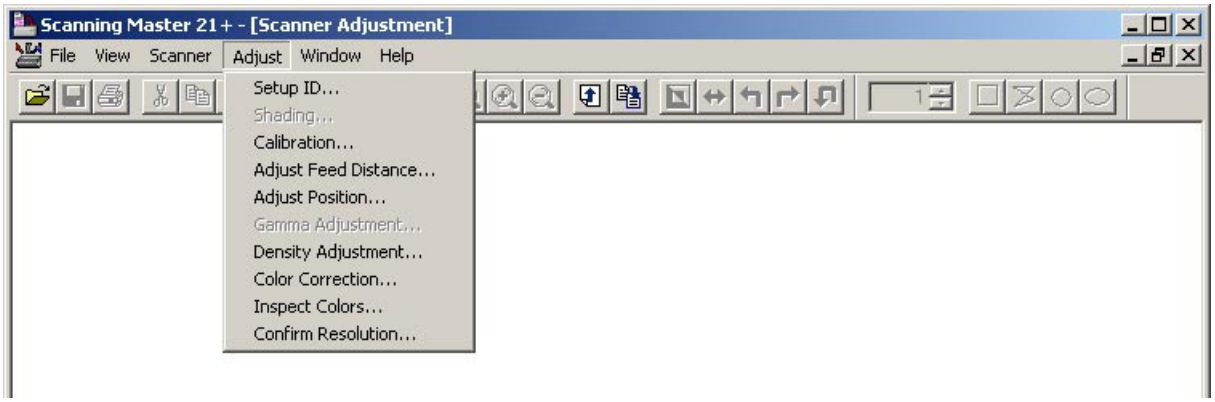
The image sensors themselves scan areas narrower than the area that can be physically scanned in order to provide a correction range.
The numbers in these boxes represent the numbers of dots from the positions at which the sensors can start their scan to those where the sensors actually start the scan.

4. Color correction (using a color correction sheet)

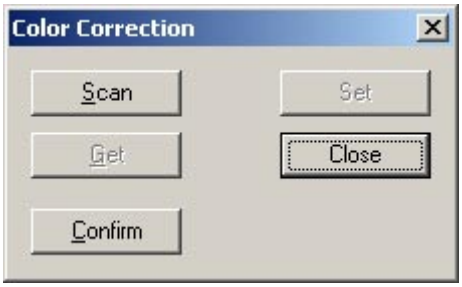
(1) Set the document hold-down unit force setting to "High".

(2) Prepare the color correction sheet.

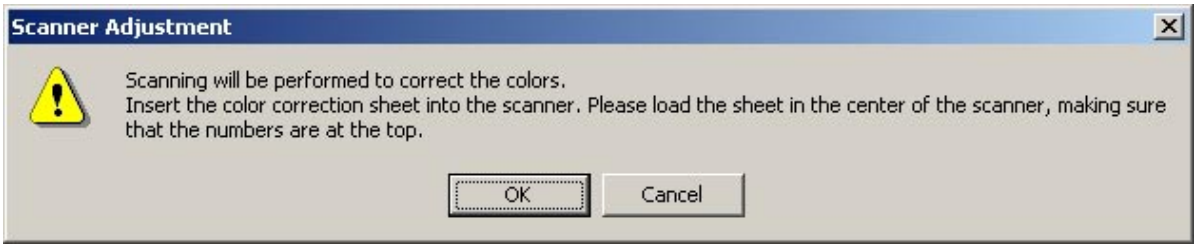
(3) Select “Color correction” from the “Adjust” menu.



(4) Click the Scan button.



(5) The following message is displayed. Insert the color correction sheet in the scanner.


Scanner Adjustment
Scanning will be performed to correct the colors.
Insert the color correction sheet into the scanner. Please load the sheet in the center of the scanner, making sure that the numbers are at the top.
OK
Cancel

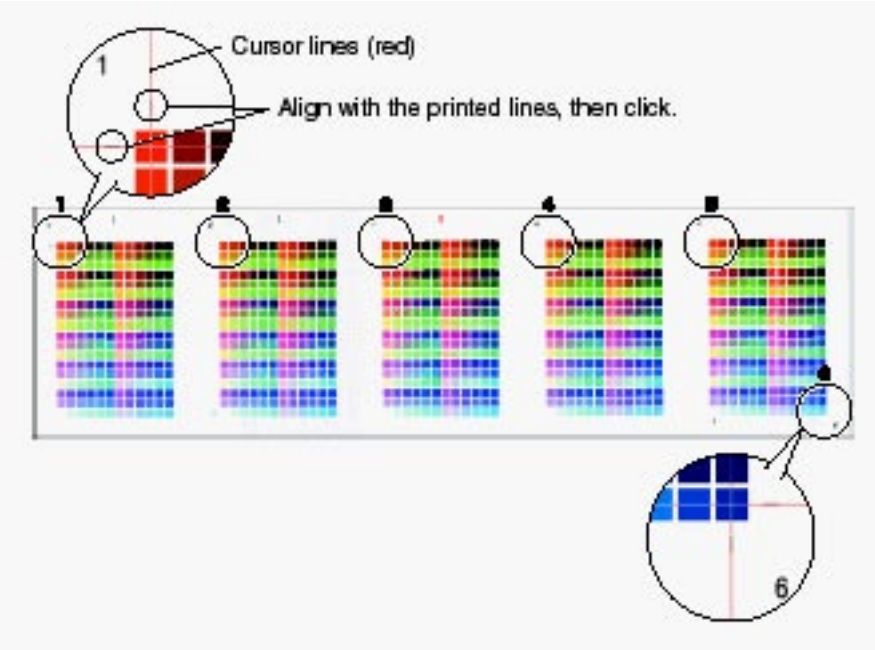
CHECKPOINT

Position the color correction sheet so that the red bar in the center of the sheet is centered in the scanner (but with the printed side down).

(6) Click the OK button to start scanning.
The scanned data is displayed when scanning is complete. Colors may differ slightly for individual sensors, but this does not indicate a defect.

(7) When the data is displayed, click the Get button.

(8) Click in the center of the color tile indicated by the numbers 1 to 6, in ascending order.
For numbers 1 to 5, click the center of the upper left tile; for number 6, click in the center of the bottom right tile. Align the cursor crosshairs with the printed lines at the sides of the tile.



CHECKPOINT

- The next reference point to be checked is displayed on the Status bar.
- If you click in error, click the Esc. key to cancel the operation and return to the immediately previous step.
- If you click on the wrong tile, color correction will not be performed correctly and the colors of the image displayed after color correction will be incorrect.

(9) After you have clicked tile number 6, click the Set button.

Click the OK button.

(10) To check the color correction results, click the Confirm button.

(11) The following message is displayed. Insert the color correction sheet in the scanner as instructed.

Scanner Adjustment
Scanning will be performed to correct the colors.
Insert the color correction sheet into the scanner. Please load the sheet in the center of the scanner, making sure that the numbers are at the top.
OK
Cancel

CHECKPOINT

Position the color correction sheet so that the red bar in the center of the sheet is centered in the scanner (but with the printed side down).

(12) Click the OK button to start scanning.
After scanning has been completed, an enlarged view of the color-corrected data is displayed.
(13) Click the Fit icon to display the entire image, and check whether there is any discrepancy in color. If there is no discrepancy, color correction is complete. Click the Close button.

CHECKPOINT

If there is still some color discrepancy after performing Color Correction, repeat steps (8) through (13).

11. TROUBLESHOOTING

Cause	Checkpoint	Remedy
Lamps on the control panel remain unlit.	Confirm that the power switch has been switched on.	Switch on the power switch.
	Confirm that the power cable is properly connected.	Connect the cable properly.
	Confirm that the cable is properly connected to the control device.	Connect the cable properly.
	Confirm that the power outputs (+24 V, +5 V, +3.3 V) are appropriate.	Check the power supplies and replace if necessary.
	Other	Replace the control panel. Replace the data controller board.
The document is not scanned, although it is moved to the scanning position.	Confirm that the PAPER LED is lit.	Check the document detection photosensor.
	Confirm that the USB cable is properly connected.	Connect the cable properly.
	Confirm that the model setting on the data controller board is set properly.	Set correct DIP switch setting for the model.
	Confirm that the USB cable is properly connected within the scanner.	Connect the cable properly.
	Confirm that the appropriate model has been specified.	Use Scanning Master 21+ to specify the correct scanner model.
	Other	Replace the main control board.
The document is not transported properly.	Check for foreign objects in the document scanning section.	Open the center cover and remove foreign objects.
	Confirm that the roller rotates when you press a control key.	Check for anomalies around the control boards.
	Confirm that the feed motor is running.	Check for anomalies around the motor.
	Confirm that +24 V is output.	Check the power supply and replace if necessary.
	Other	Replace the control boards. Replace the main control board.
The document is not automatically returned when the scan is complete.	Confirm that “Front” is selected for “Paper Control” in Scanning Master 21+.	Select “Front” for “Auto Eject.”
	Confirm that the document is properly fed back.	Check for anomalies around the paper feed section and the motor.
The scanned data is completely black.	Confirm that an appropriate white correction value has been specified.	Perform Calibration (white correction).
	Confirm that the image sensor cables are properly connected.	Confirm that the image sensor cables are properly connected, with no broken wires.
	Confirm that the image sensor LEDs are lit.	Check the +5 V power supply and replace it if it is faulty. Replace the data controller board. Replace the image sensors.
	Confirm that an appropriate value is specified for “Intensity (Brightness)” in Scanning Master 21+.	Adjust “Intensity (Brightness)” in Scanning Master 21+.

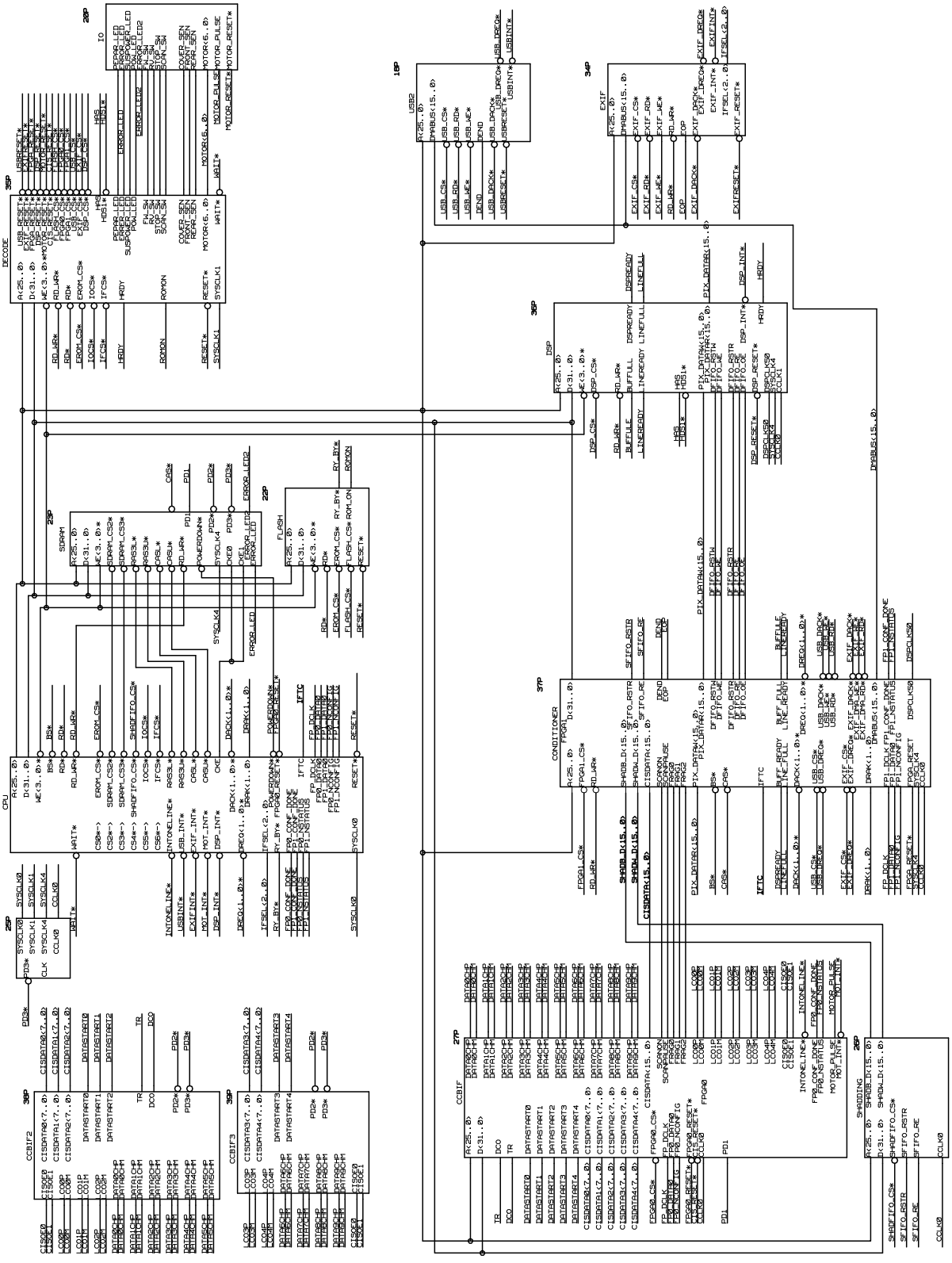
Cause	Checkpoint	Remedy
The scanned drawing has undesired black lines.	Clean the scanning glass and replace if necessary.	Clean the scanning glass and replace if necessary. Clean the image sensors.
	Confirm that calibration (white correction) has been properly performed.	Perform calibration from the beginning (white correction).
	Check the document hold-down plate for stains.	Clean the document hold-down plate.
	Check whether the problem persists after cleaning and adjustments.	Replace the image sensors.
The scanned drawing has undesired white lines.	Check the scanning glass for dust and damage.	Clean the scanning glass and replace if necessary.
	Confirm that calibration (white correction) has been properly performed.	Perform calibration from the beginning (white correction).
Part of the scanned drawing is missing (the scanned drawing is horizontally compressed).	Confirm that the sensor X overlaps and Y offsets are appropriate.	Align the sensor joints.
Part of the scanned drawing is overlapped.	Confirm that the sensor X overlaps and Y offsets are appropriate.	Align the sensor joints.
The image quality is poor.	Check whether the scanning glass is dirty.	Use purified water or alcohol to clean the scanning glass. (Do not use chemical solvents.)
	Confirm that the image resolution is appropriate.	Select an appropriate resolution.
The PC does not detect the scanner.	Confirm that the scanner has been turned on.	Turn on the scanner.
	Confirm that the PC has detected the USB or IEEE 1394 card properly.	Reattach the USB or IEEE 1394 card, set it up, and reinstall the USB or IEEE 1394 driver.
	Check the cable for broken wires, shorting, and bent connector pins.	Replace the cable.
	Confirm that the power supply for the scanner unit functions properly.	Check the supply voltage and replace the power supply as necessary.
	Use a PC that correctly detects other scanners to determine whether the problem is with the PC itself.	Replace the data controller board or IEEE 1394 board. (Reinstall the boot program.)
When placed on the scanner, the paper is moved beyond the scanning section and drops to the back of the scanner.	The paper sensor does not function properly.	Clean the paper sensor. Check the sensor cable for contact with other cables. Replace the paper sensor.

Cause	Checkpoint	Remedy
Paper jam occurs.	Check the transfer section for foreign objects.	Remove foreign objects.
There is a difference in color density between the right- and left-hand portions of the document scanned in grayscale.	The sensor color density has not been properly corrected.	Adjust color density.

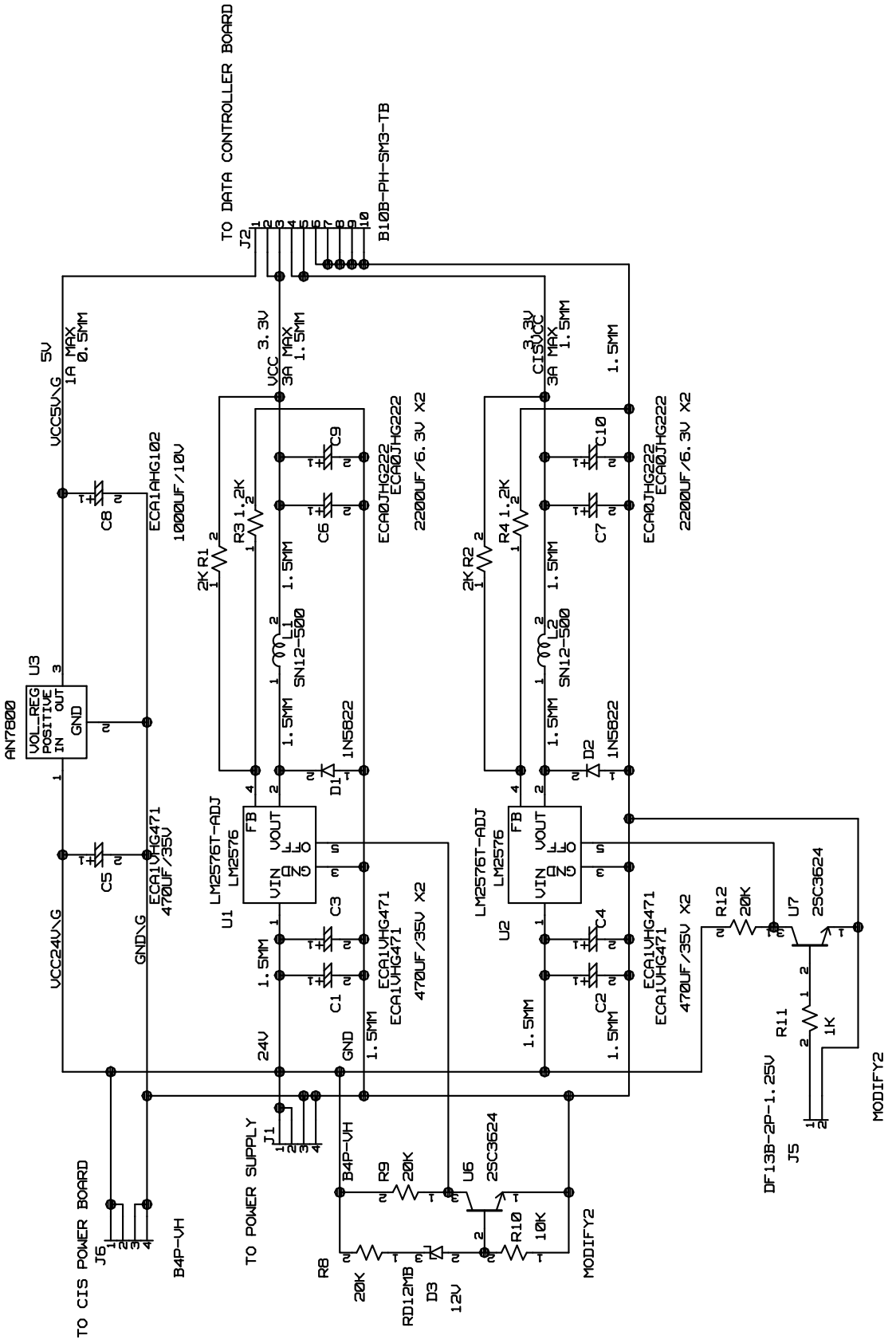
12. SCHEMATIC DIAGRAMS

12.1 Data Controller Board

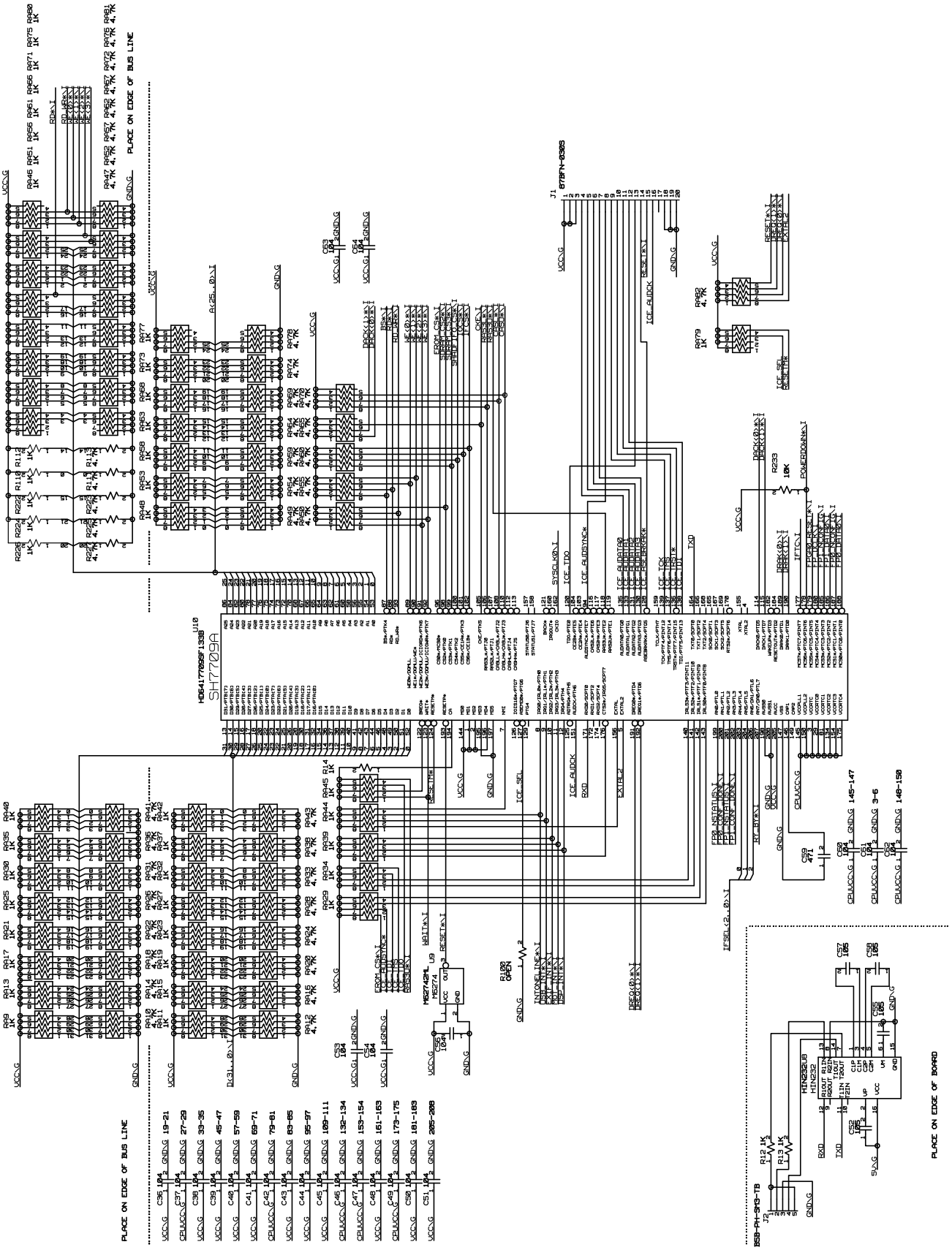
Data Controller Board (1/15)



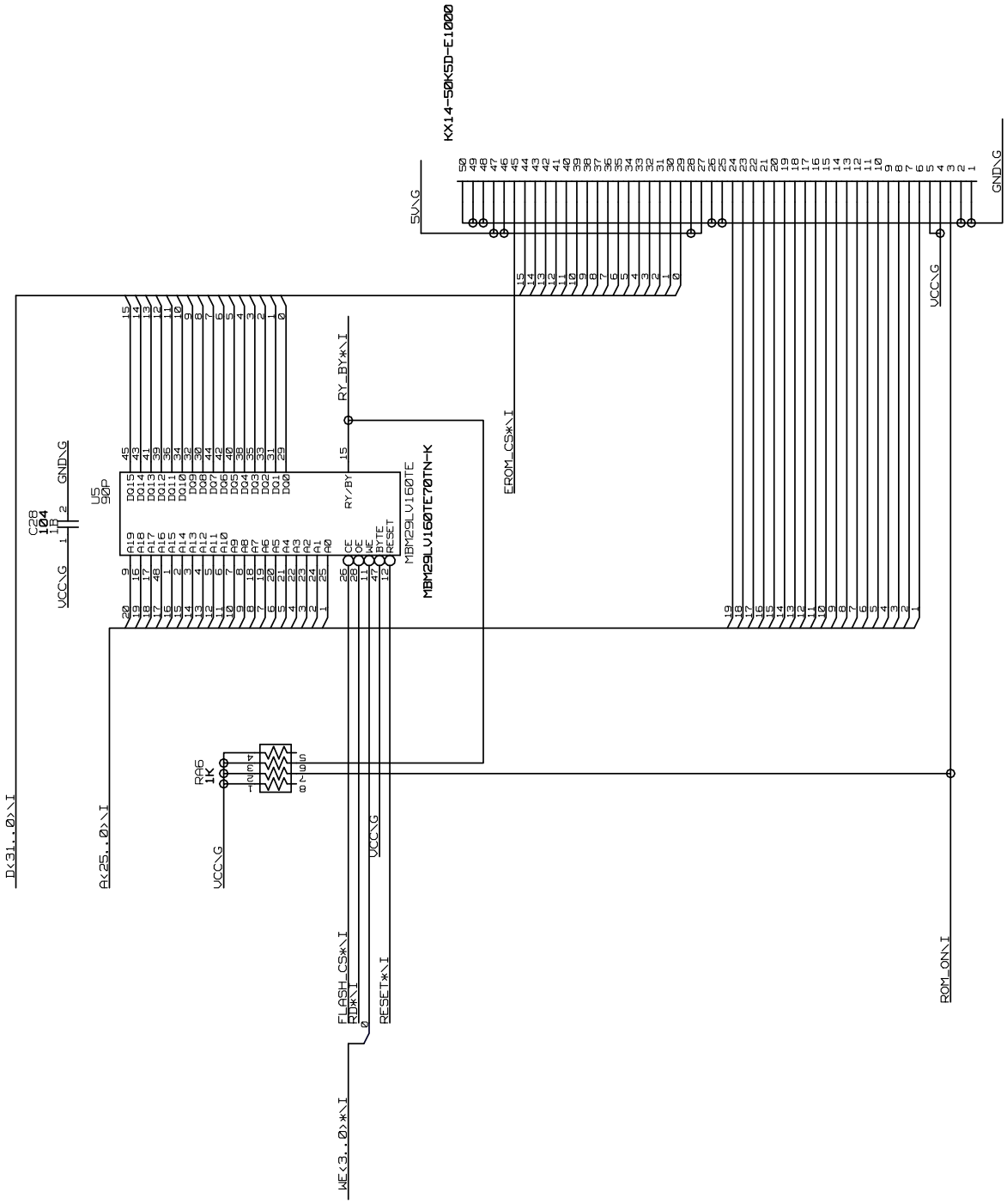
Data Controller Board (2/15)



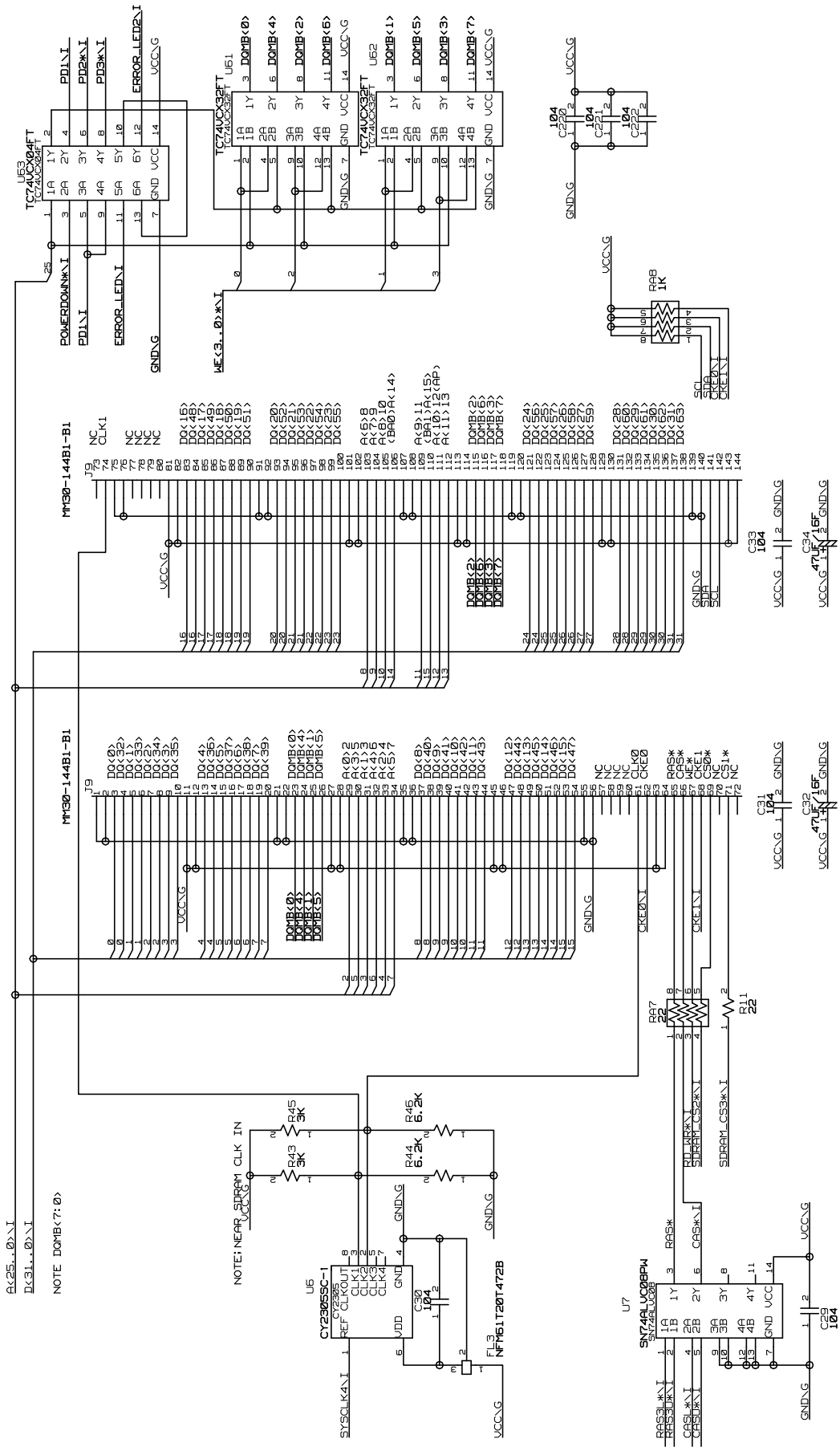
Data Controller Board (3/15)



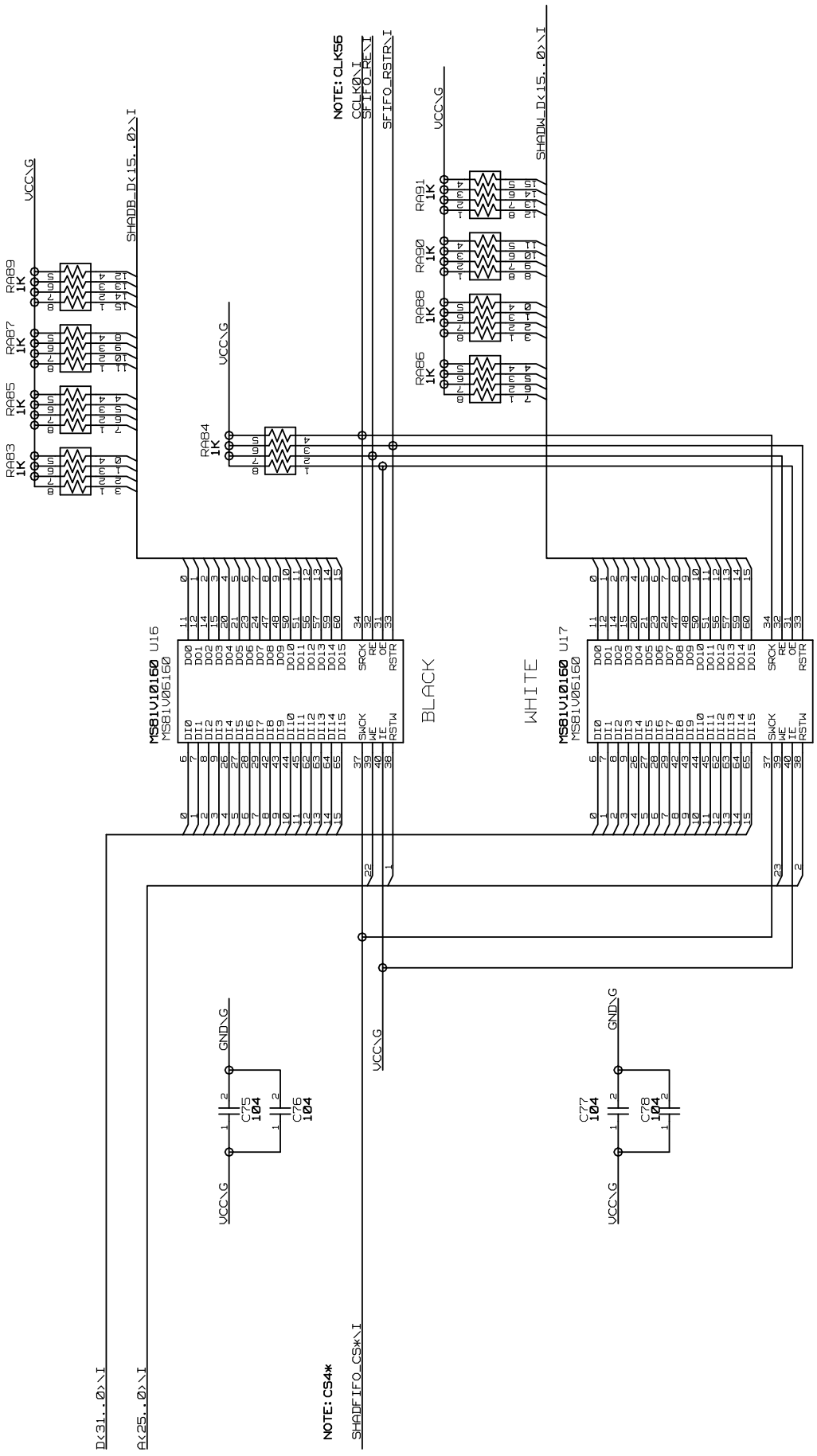
Data Controller Board (4/15)



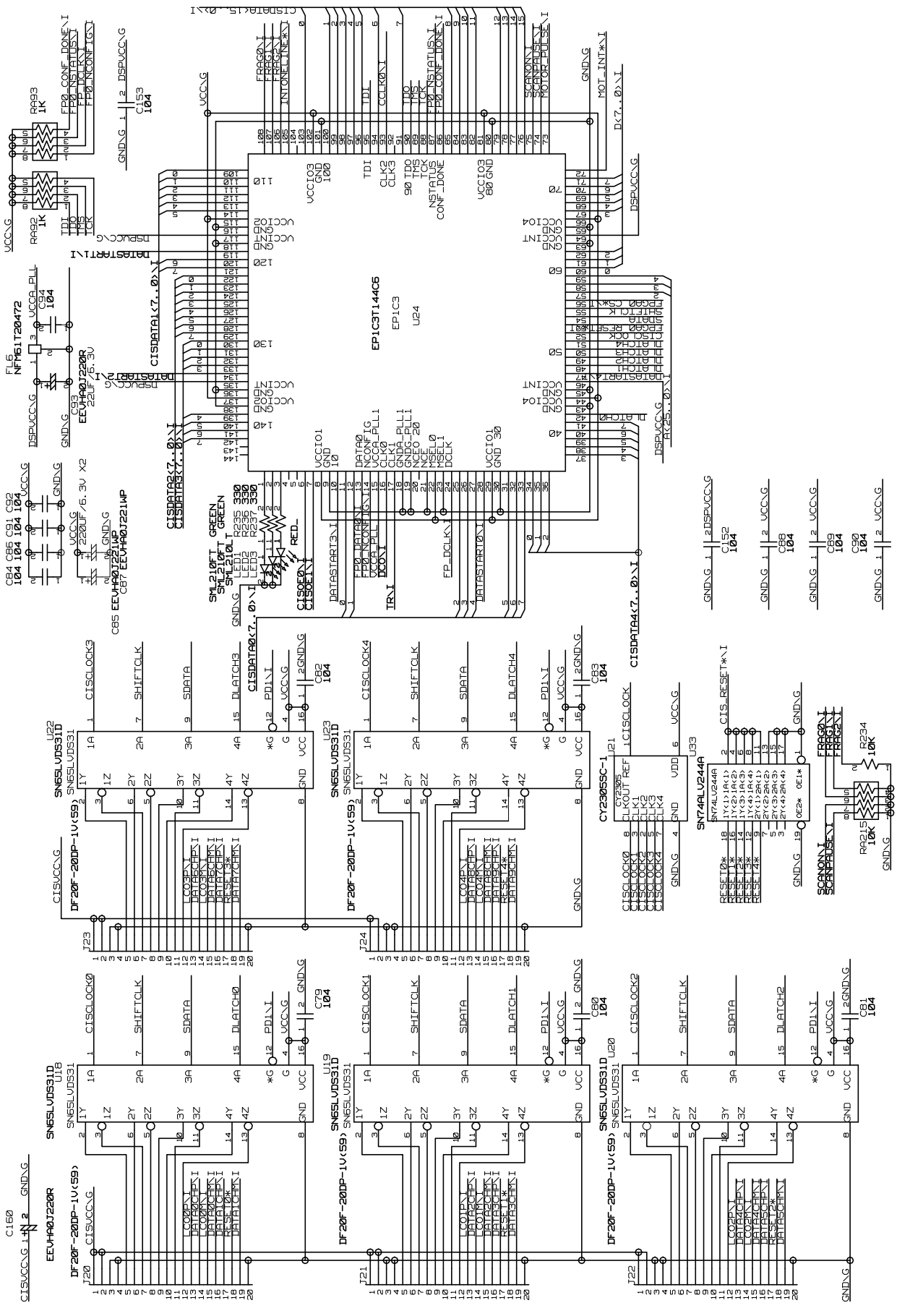
Data Controller Board (5/15)



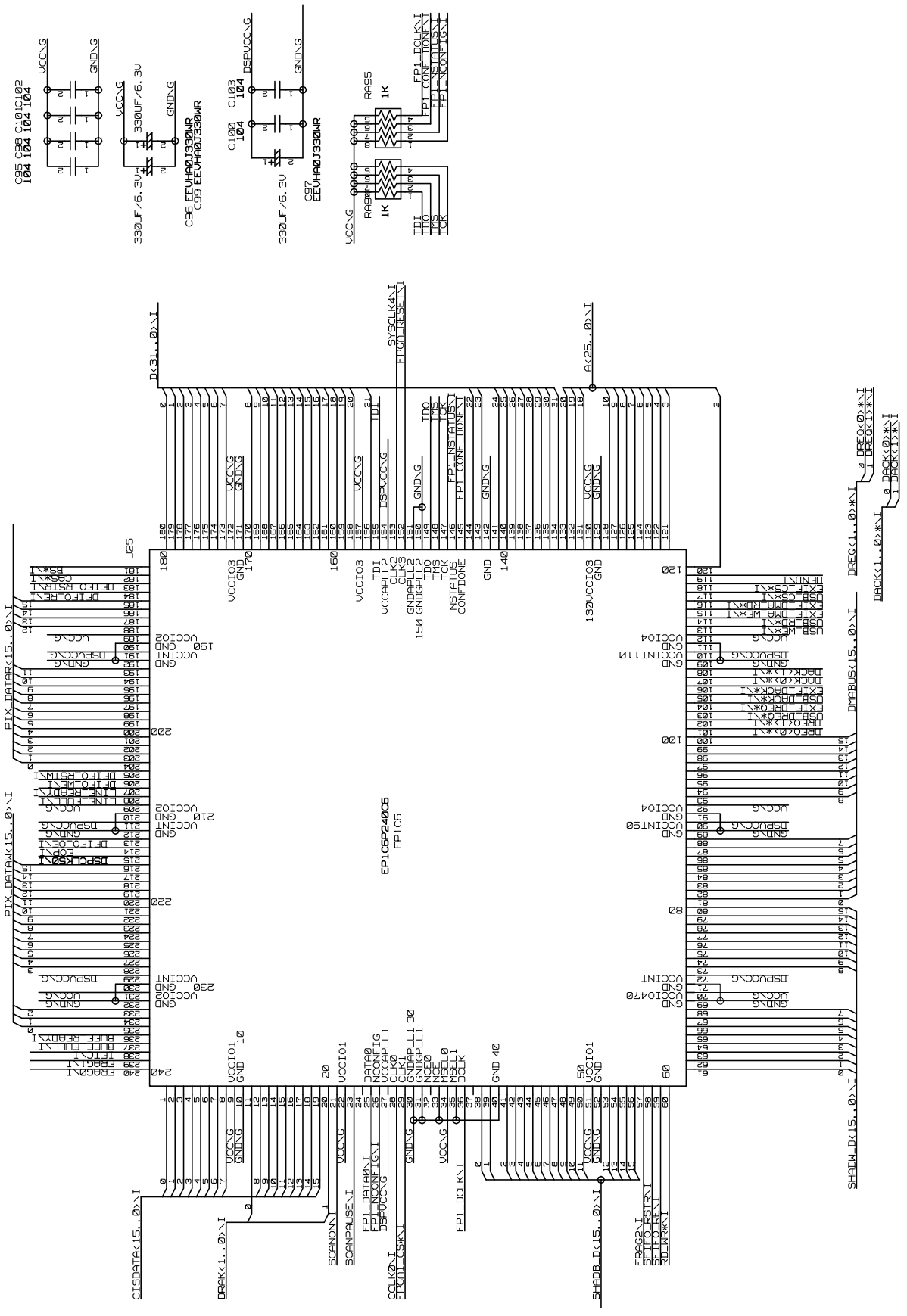
Data Controller Board (6/15)



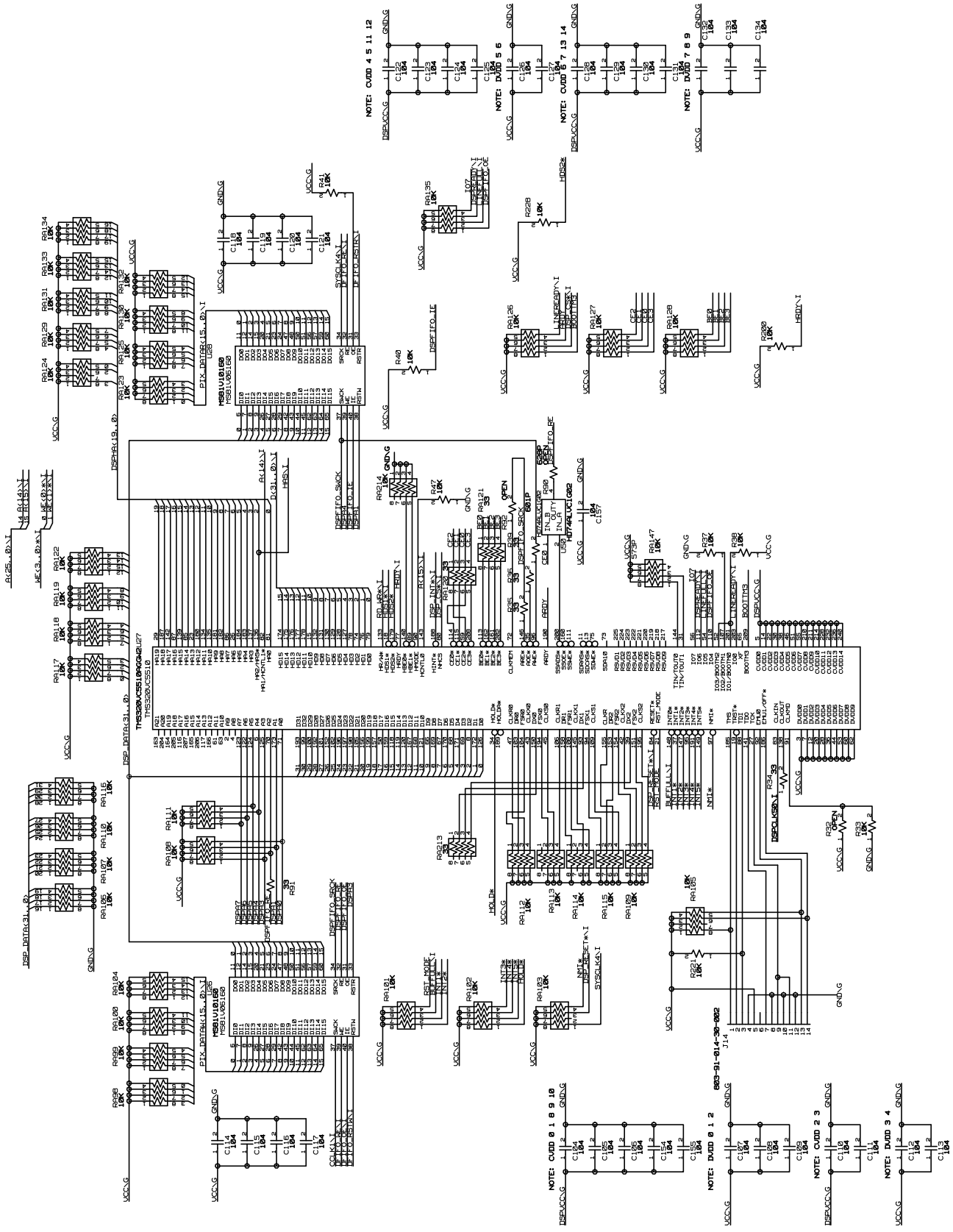
Data Controller Board (7/15)



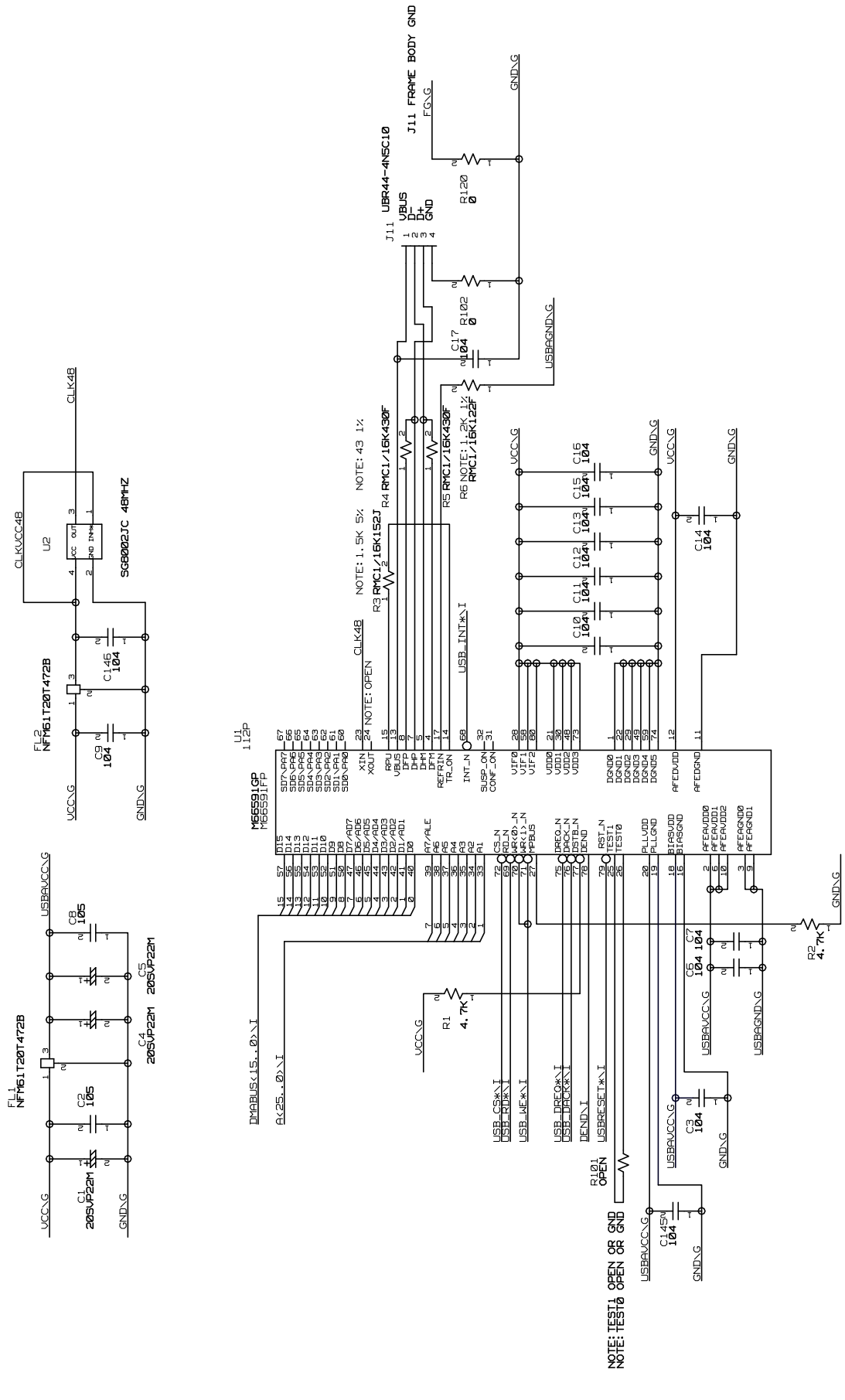
Data Controller Board (8/15)



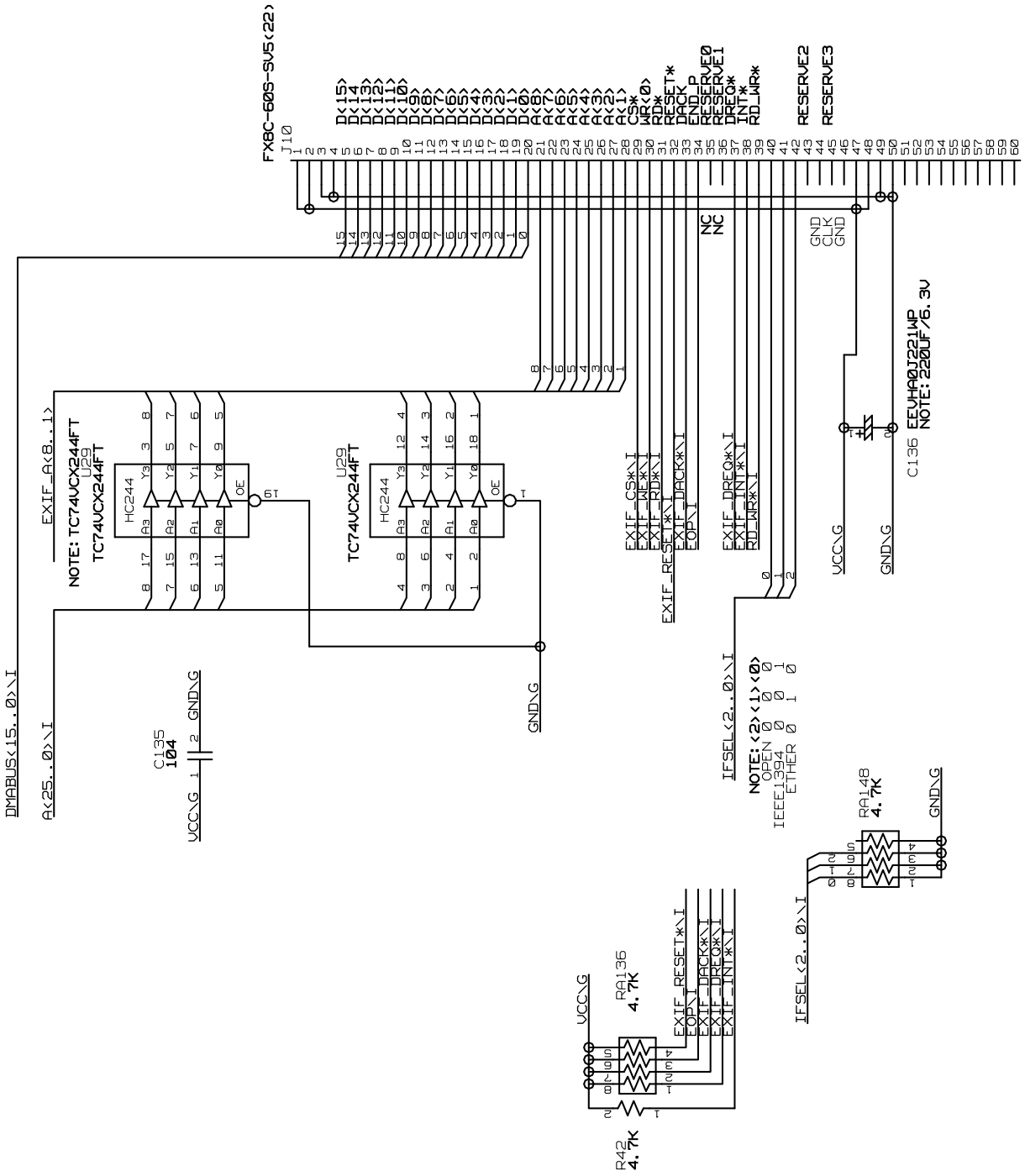
Data Controller Board (9/15)



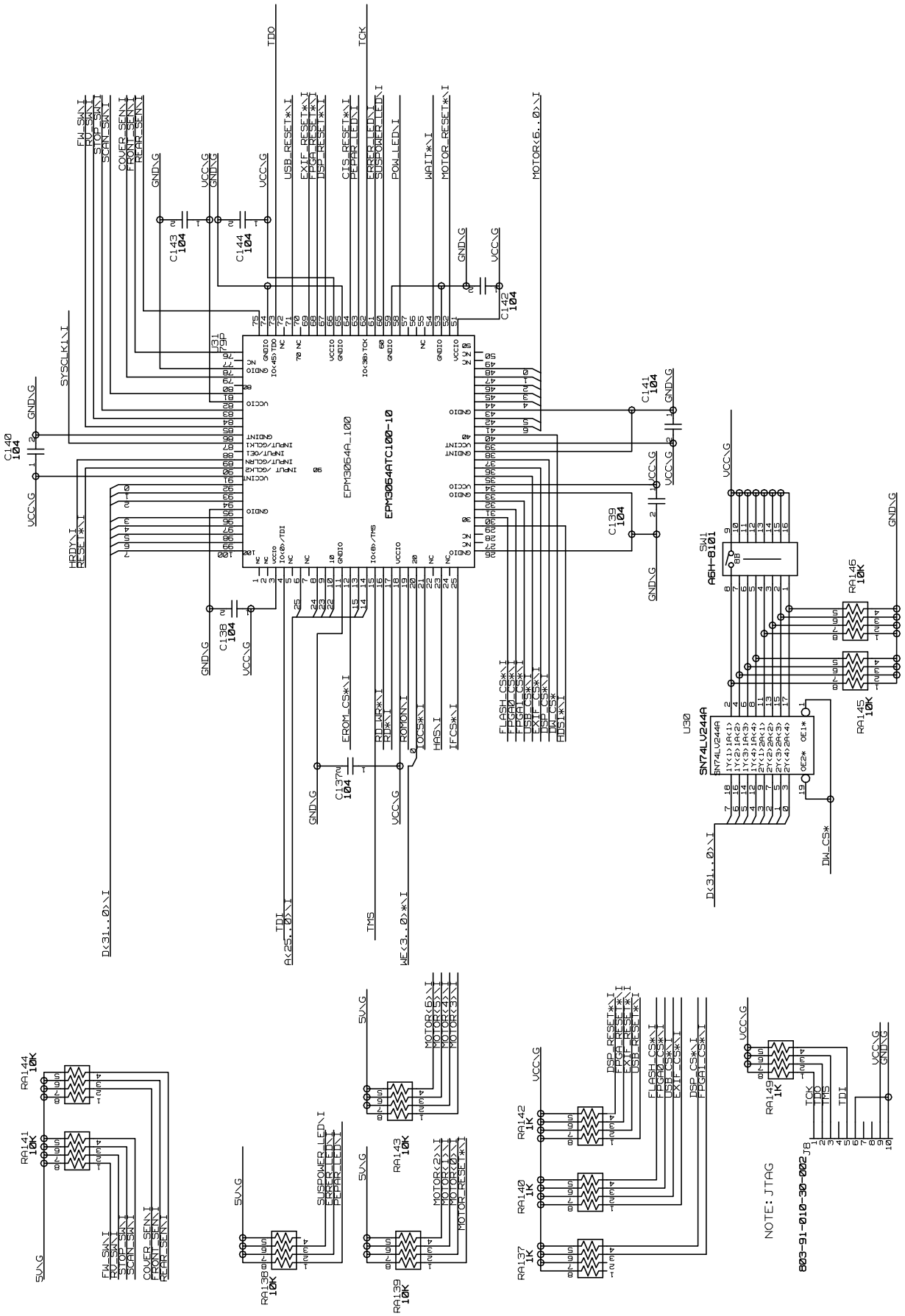
Data Controller Board (10/15)



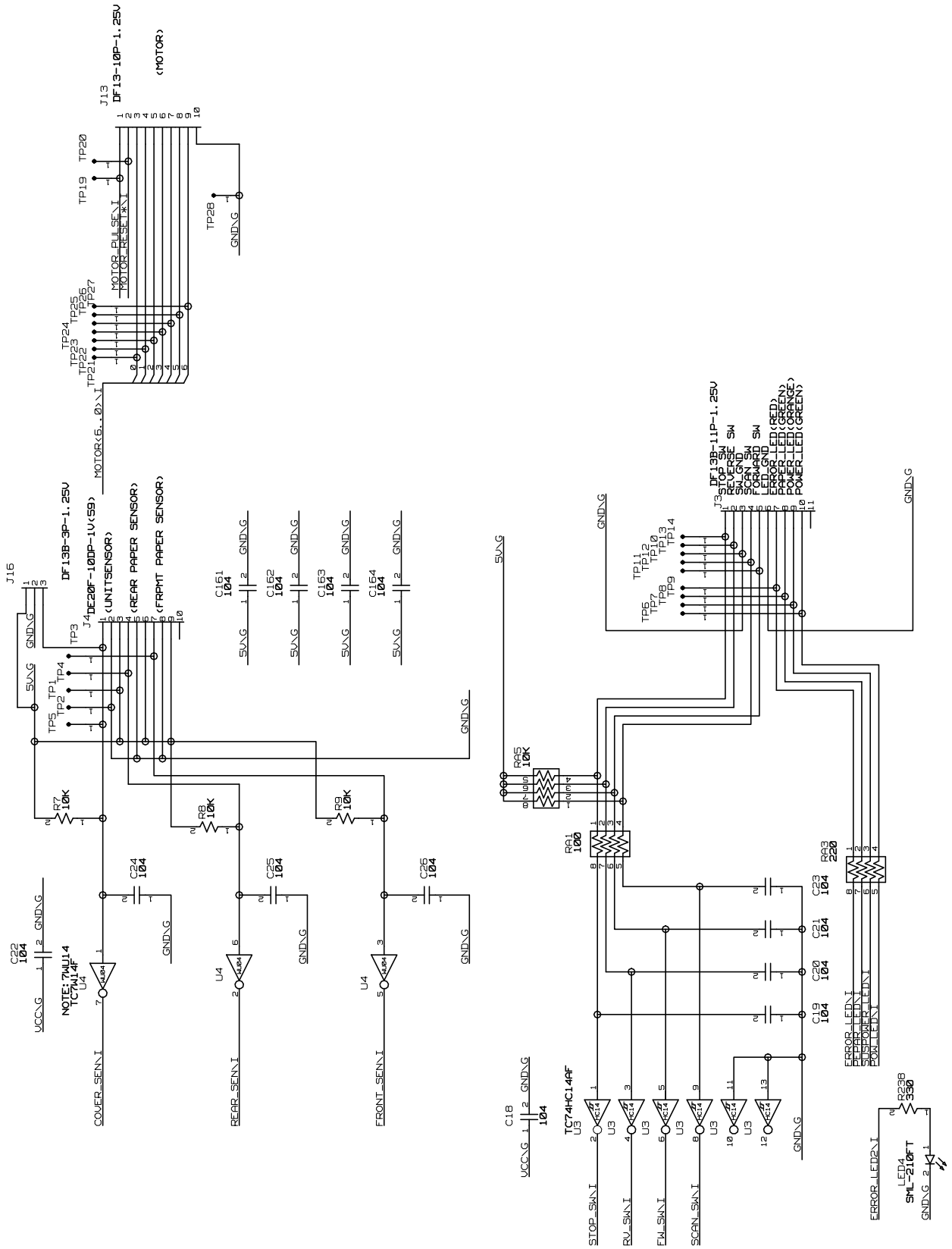
Data Controller Board (11/15)



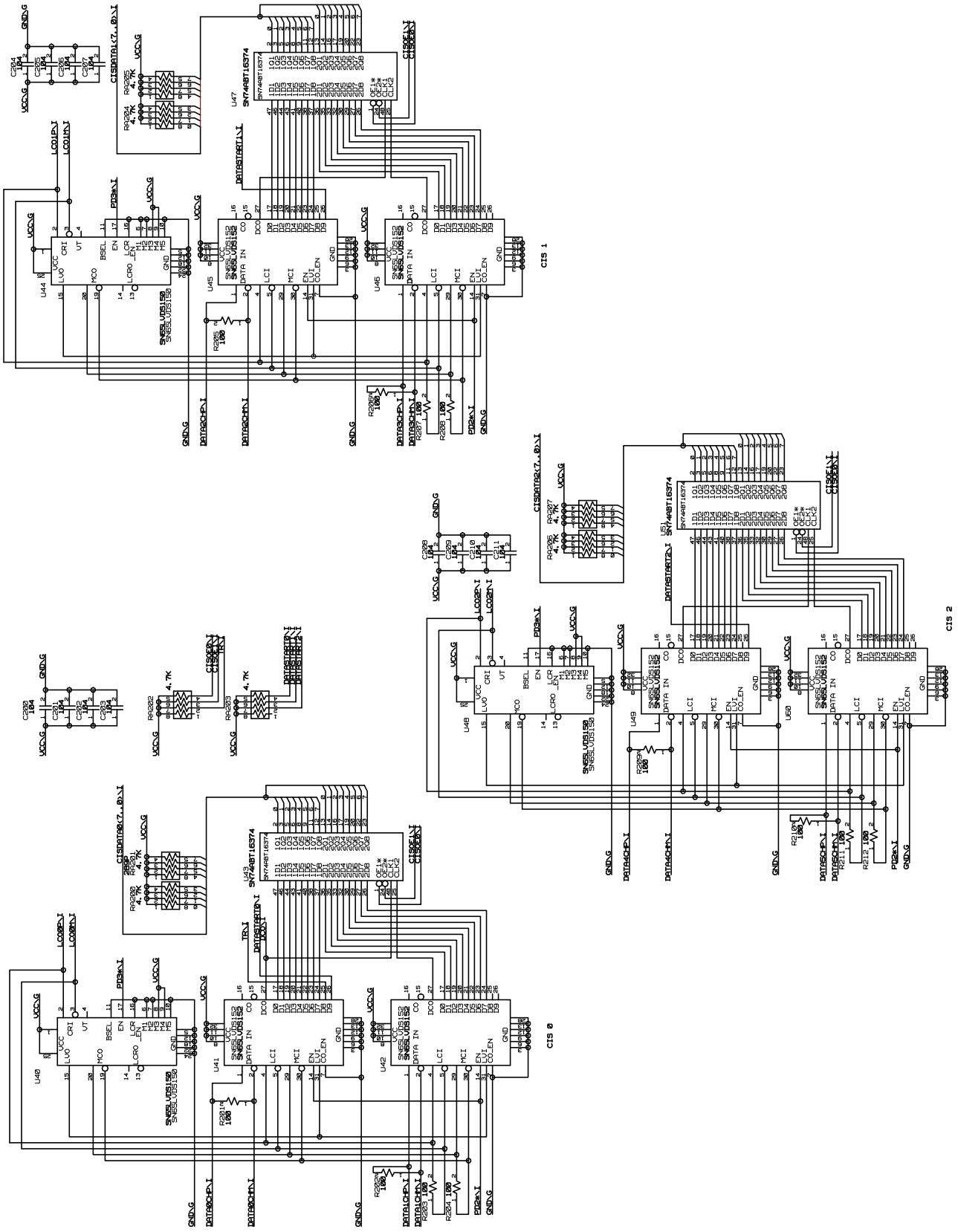
Data Controller Board (12/15)



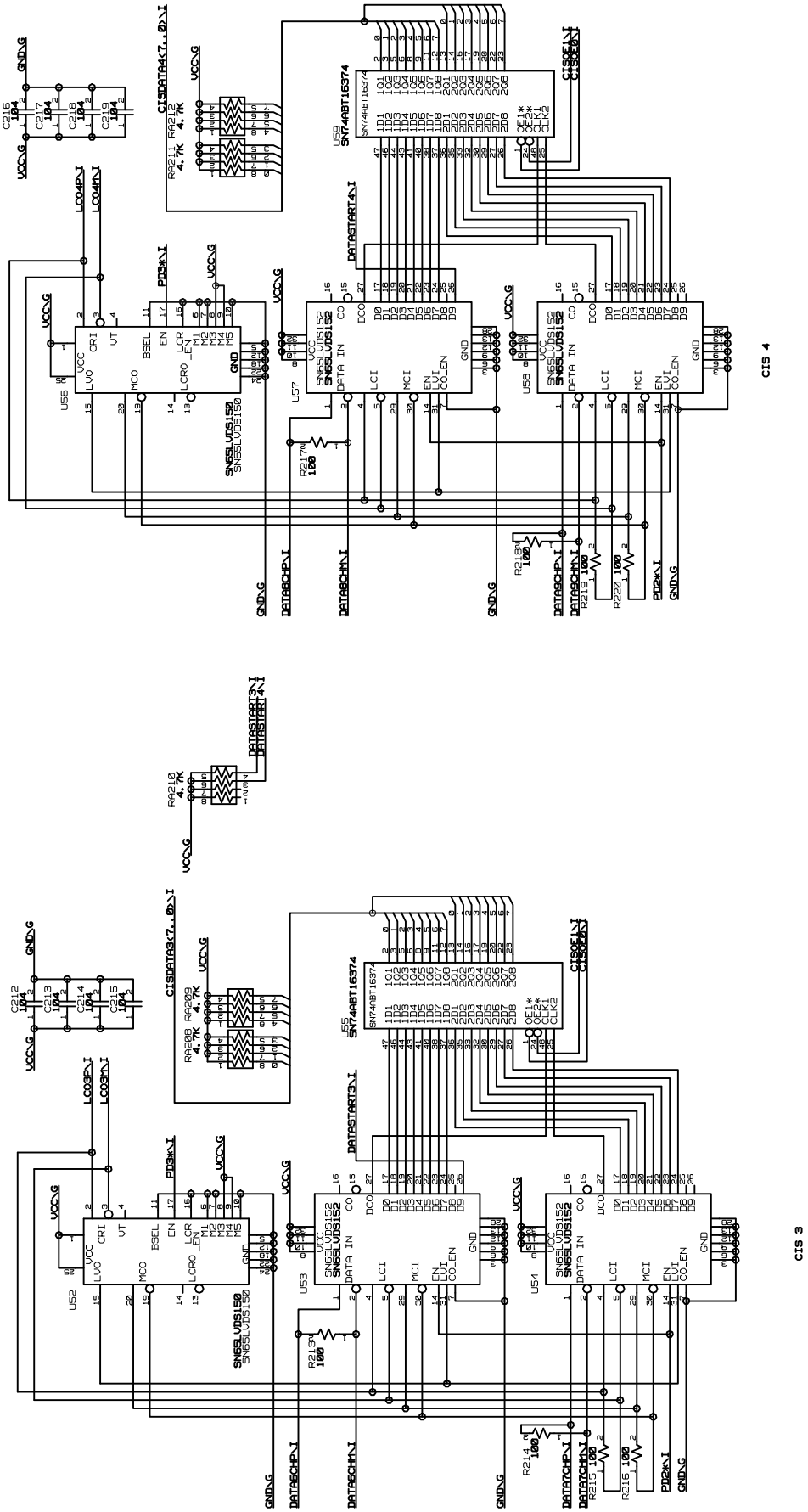
Data Controller Board (13/15)



Data Controller Board (14/15)

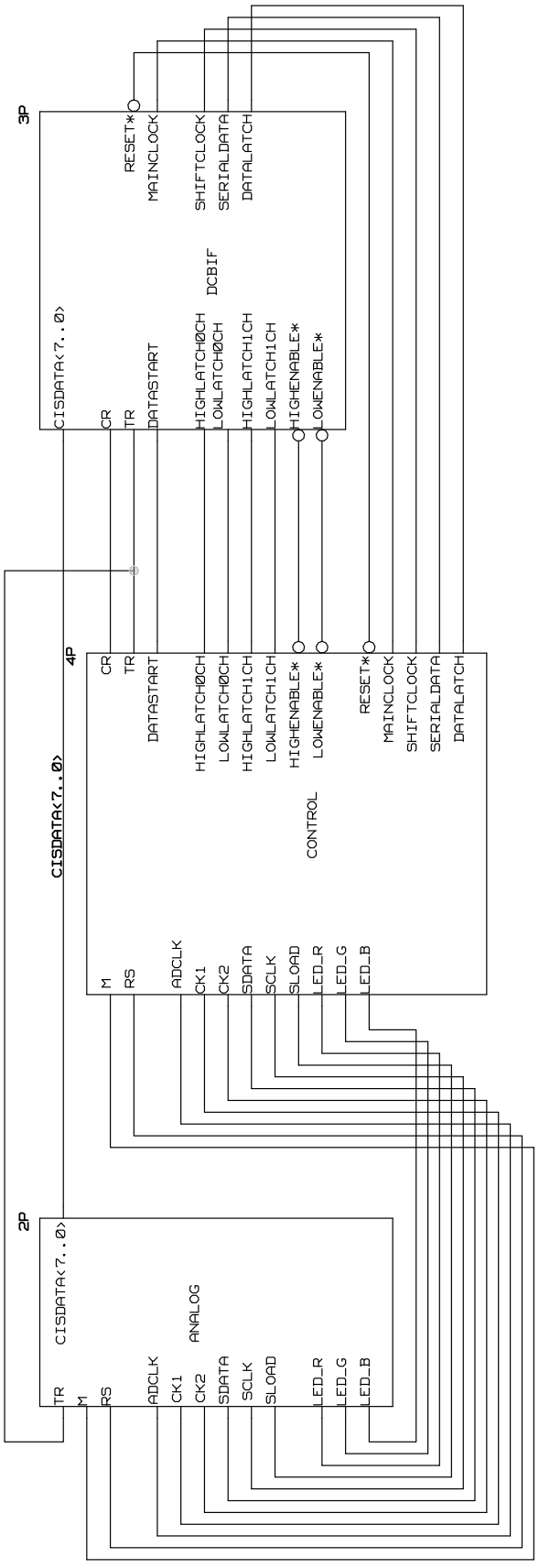


Data Controller Board (15/15)

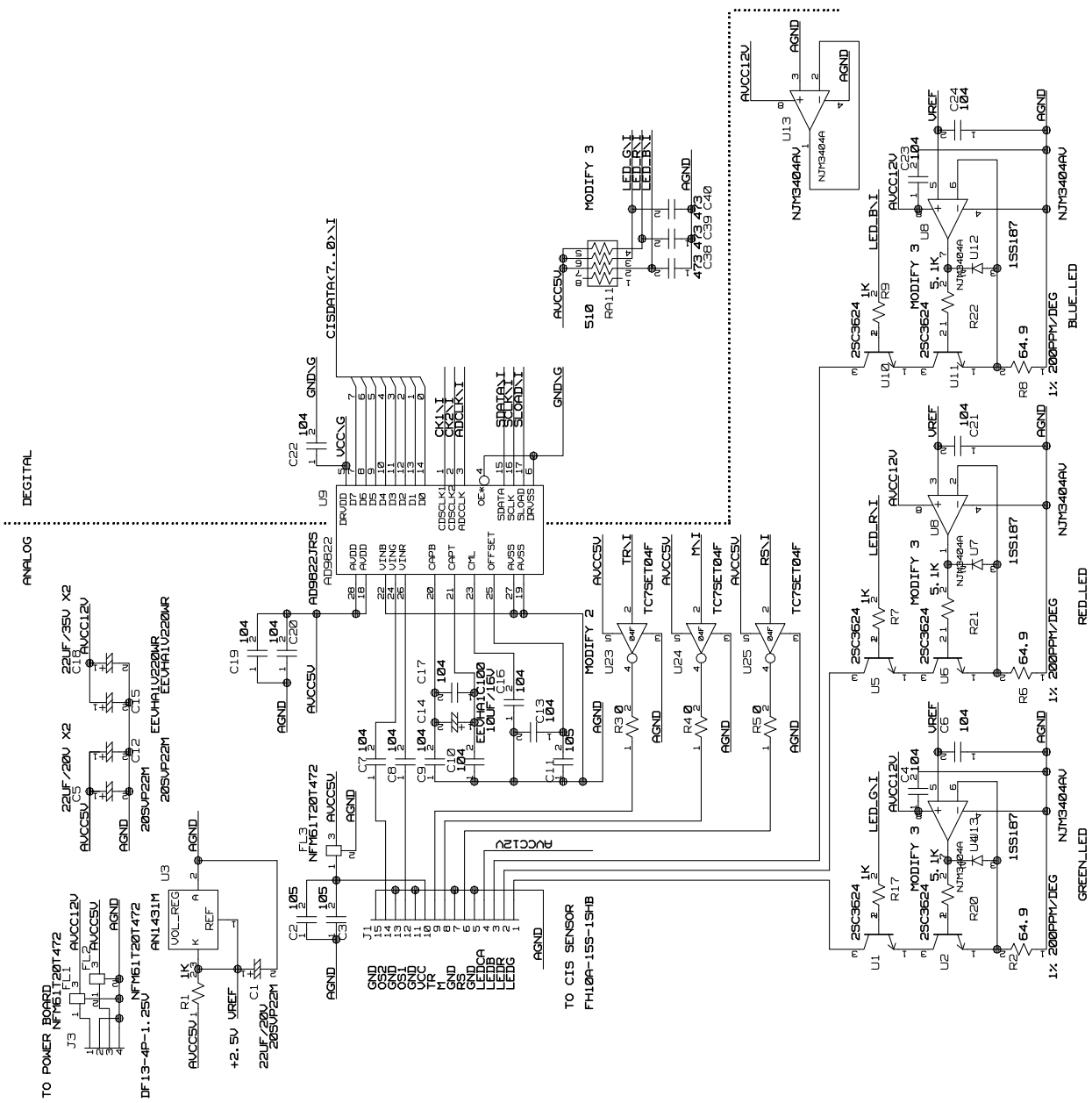


12.2 CIS Controller Board

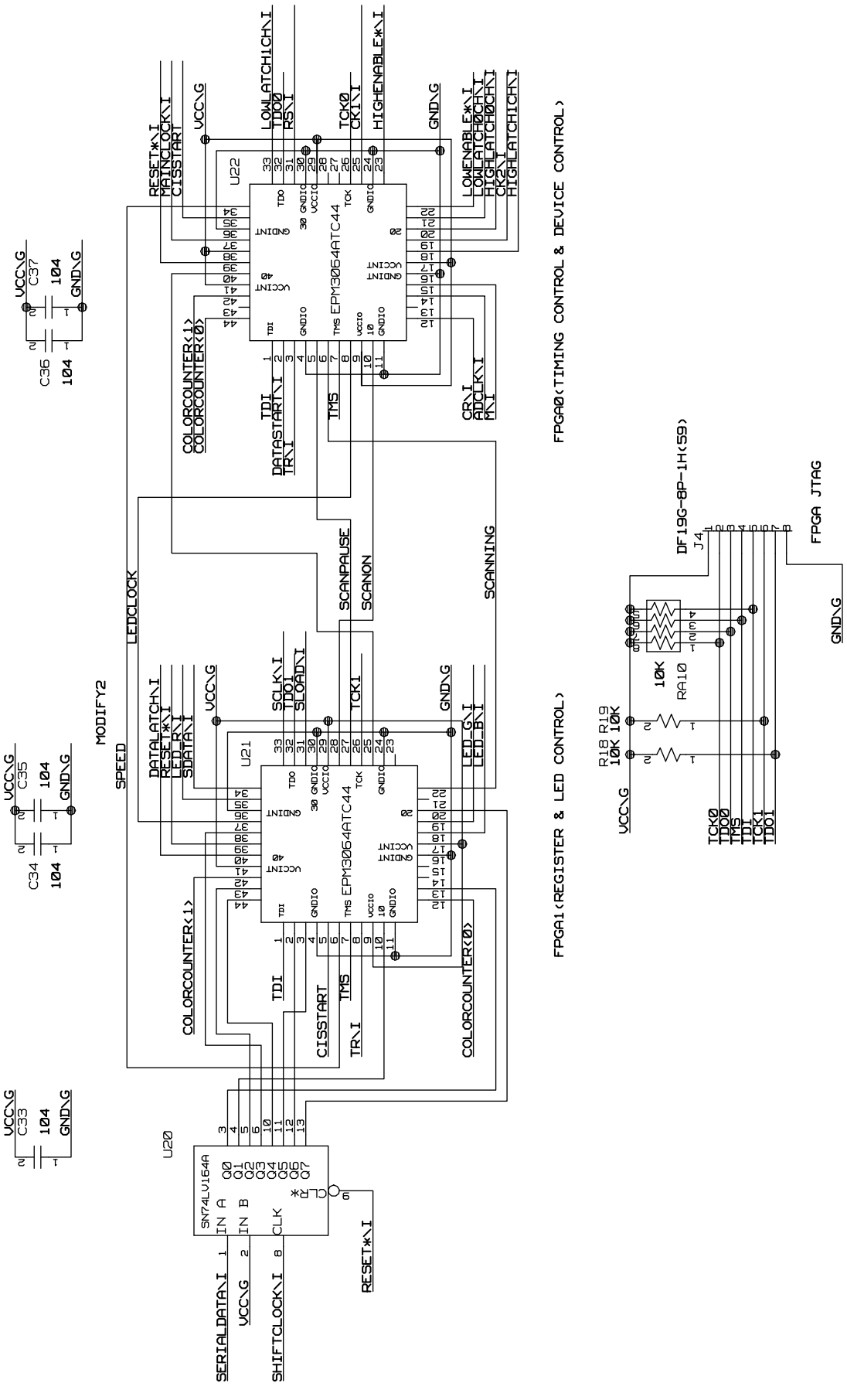
CIS Controller Board (1/4)



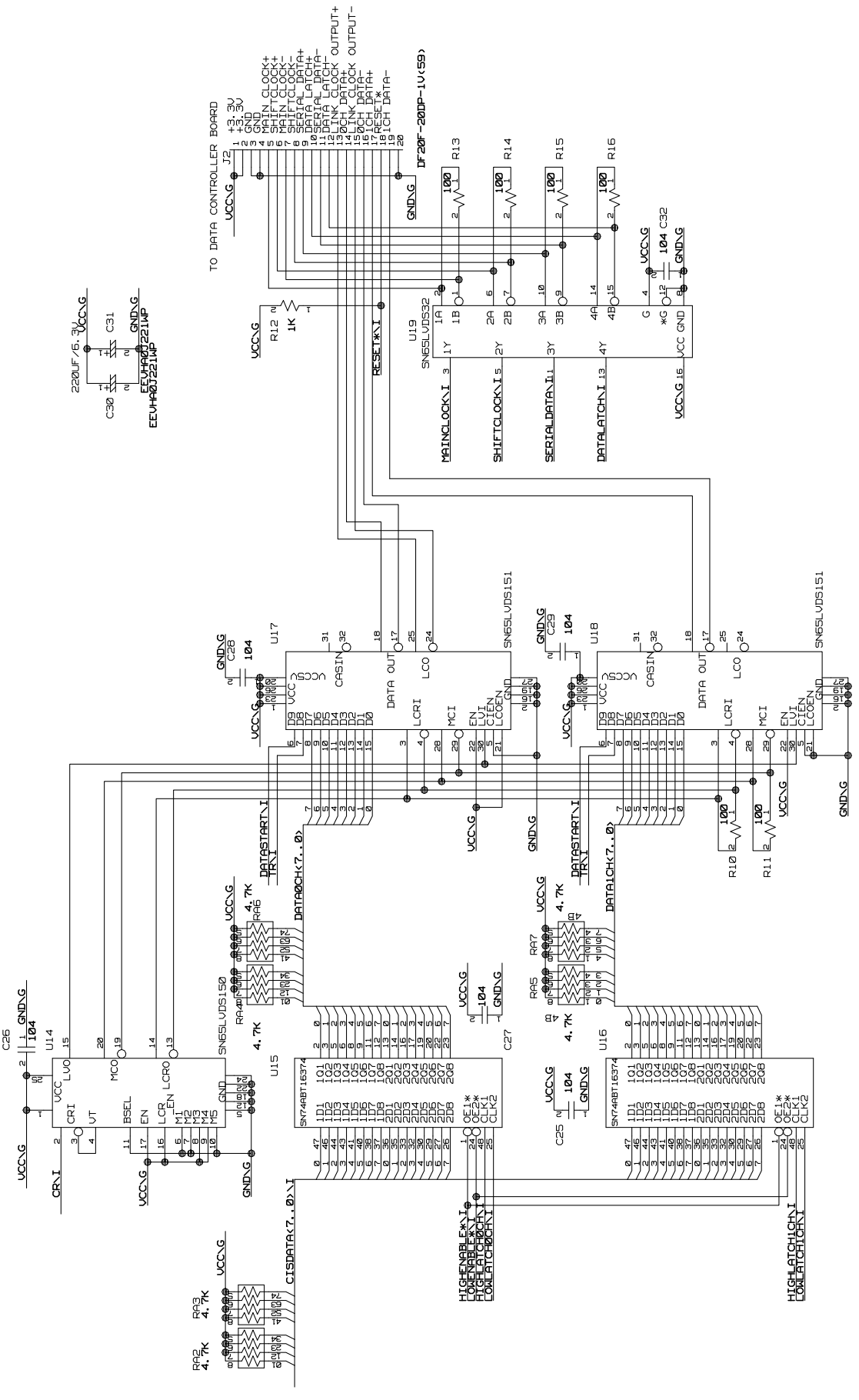
CIS Controller Board (2/4)



CIS Controller Board (3/4)

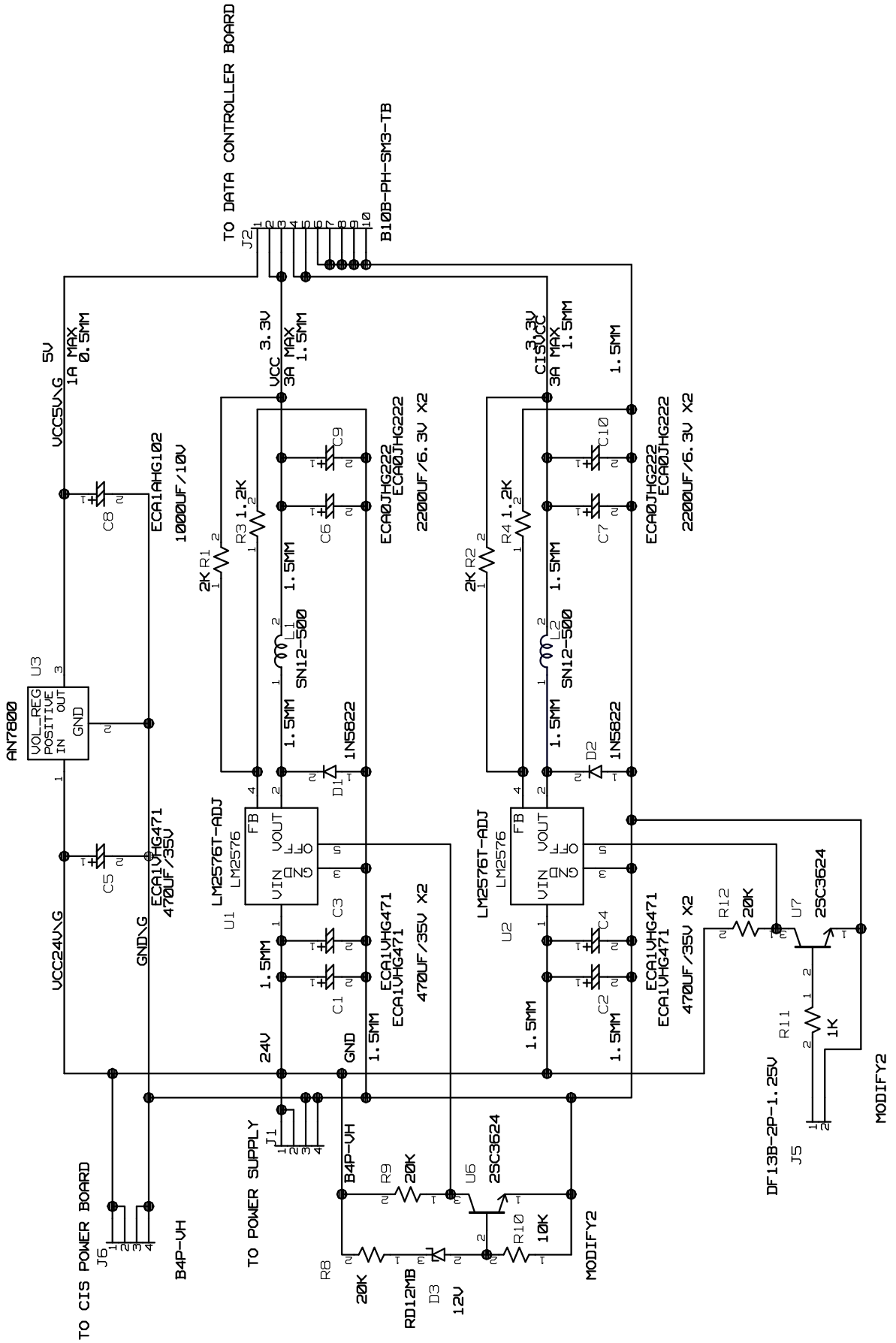


CIS Controller Board (4/4)

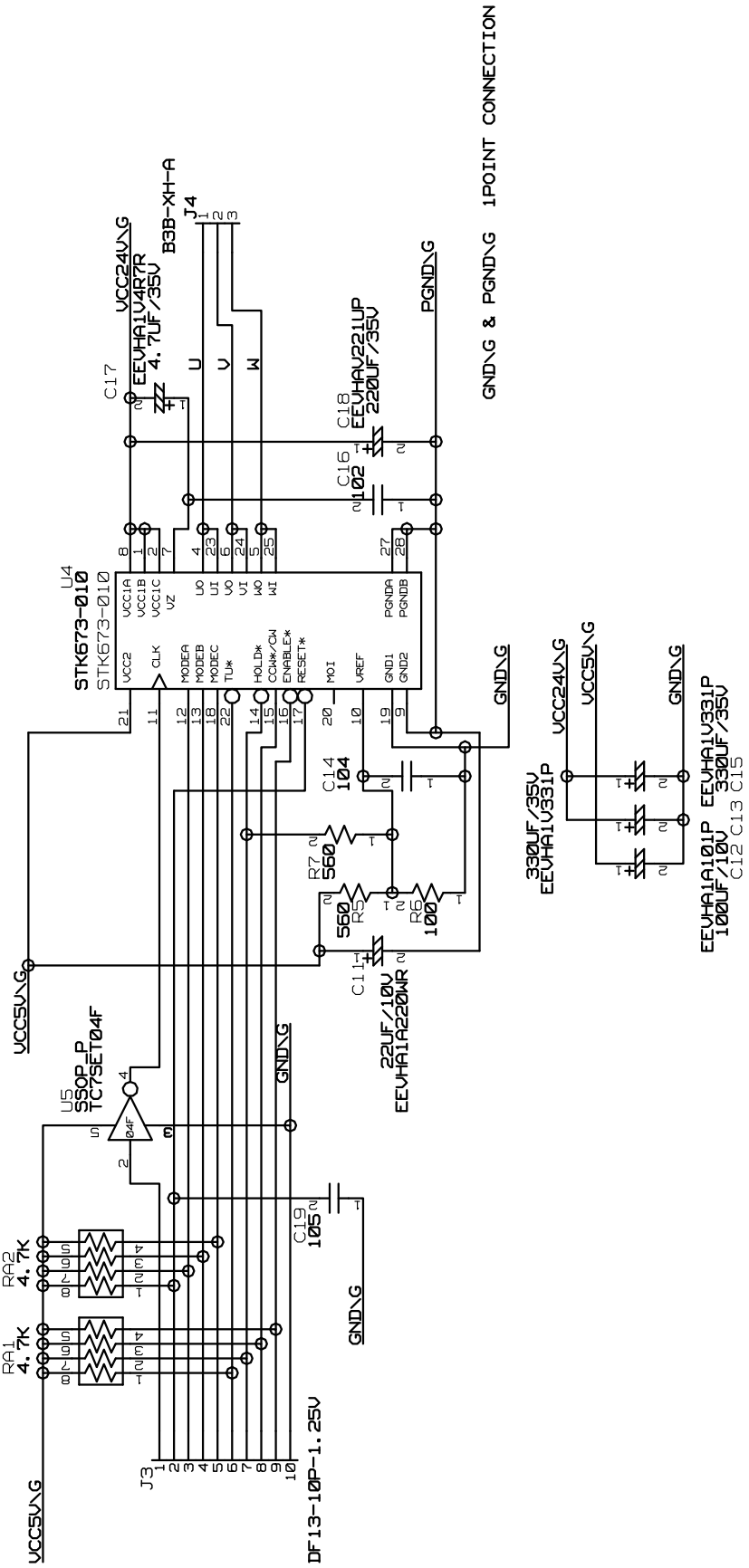


12.3 Data Power Board

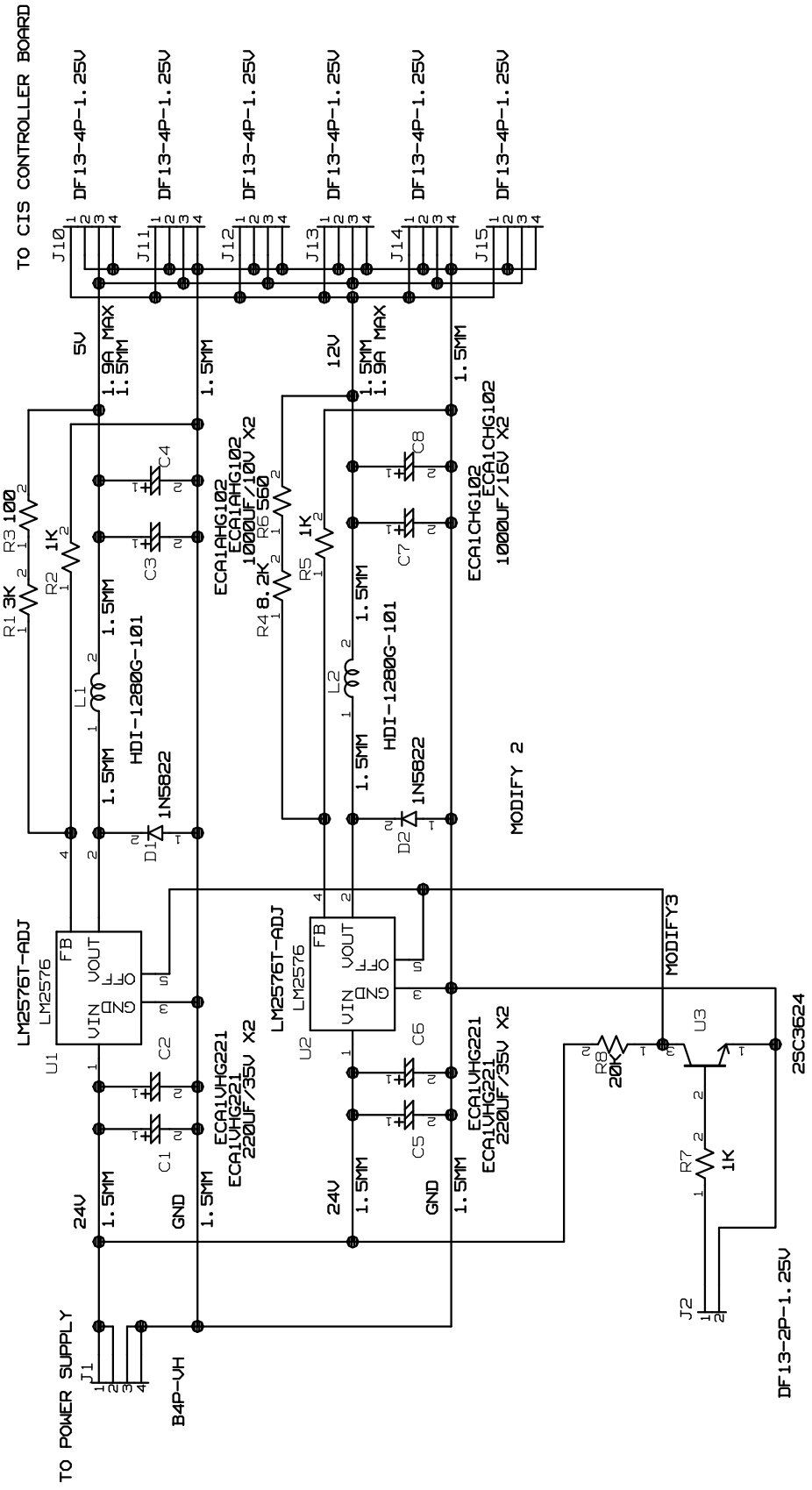
Data Power Board (1/2)



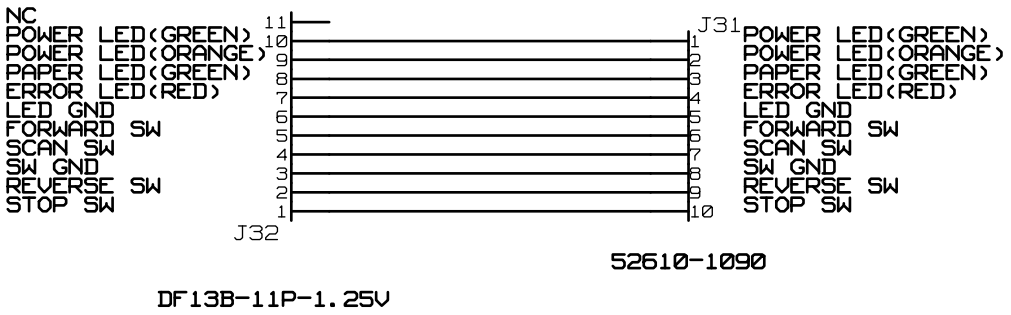
Data Power Board (2/2)



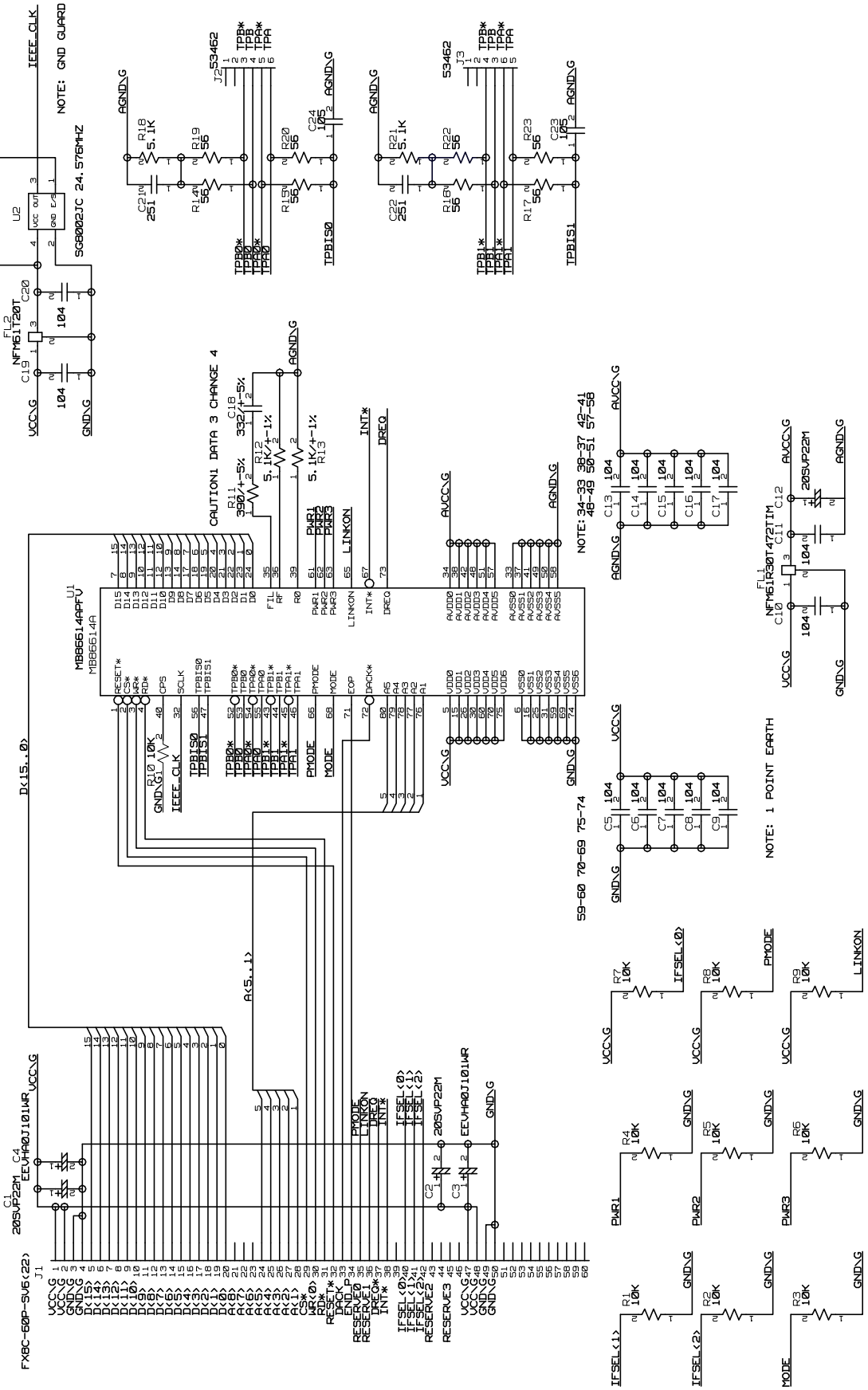
12.4 CIS Power Board



12.5 Relay Board



12.6 IEEE 1394a Board



13. OPTION

13.1 Optional Items

Code	Item Name
OPS115-KIT-E	Software to upgrade OPS112 Scanning Master 21+ to OPS115 Scanning Master Pro Color

13.2 Consumables

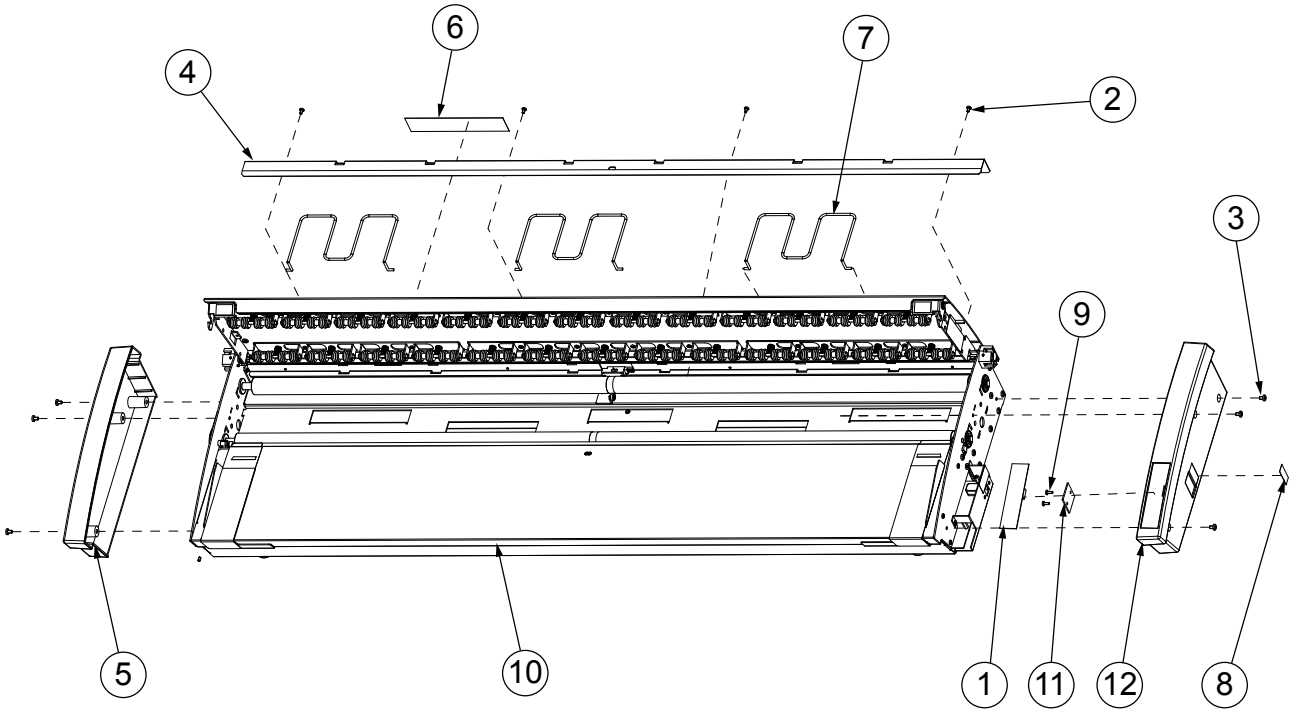
Code	Item Name
IS0907	Carrier Sheet (A0)
IS0908	Carrier Sheet (A1)
IS0913	Calibration Sheet (A0)
EM-CP	Cleaning paper (50 sheets)

14. PARTS LIST

14.1 Outer Casing

No.	Part No.	Part name	Description	Q'ty	Remarks
1	641300000	Control Panel 3SB		1	
2	480003061	M3L6 Binding Head Screw		4	
3	480004061	M4L6 Binding Head Screw		6	
4	641300070	Rear Cover		1	
5	641300030	Left Side Cover		1	
6	641300610	Model Name Label CS300-10		1	CS300-10
	641300660	Model Name Label CS400-10		1	CS400-10
7	640310450	Document Guide	Document Guide IS31	3	
8	641300620	USB Label		1	
9	391526069	M2.6L6 Self Tapping Screw		2	
10	774015507	Relay Board		1	
11	641300020	Right Side Cover		1	

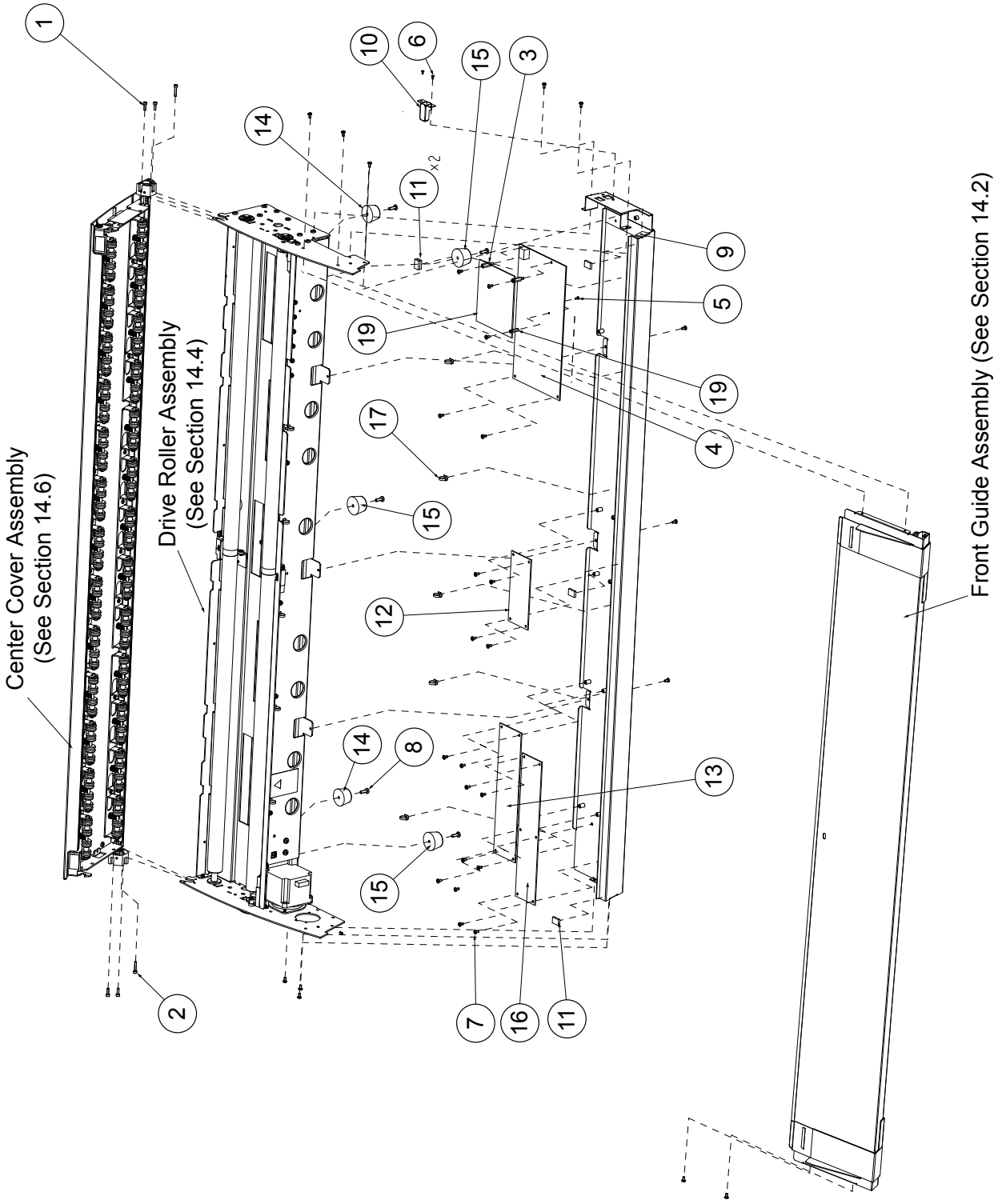
Outer Casing



14.2 Main Frame

No.	Part No.	Part name	Description	Q'ty	Remarks
1	480063103	M3L10 Cap Screw		4	
2	480063143	M3L14 Cap Screw		2	
3	393230160	Spacer	BSB-316	2	
4	774015500	Data Controller Board		1	
5	480002051	M2L5 Binding Head Screw		1	
6	480004121	M2L5 Flat Head Screw		2	
7	480003061	M3L6 Binding Head Screw		25	
8	480004121	M4L12 Binding Head Screw		5	
9	641300080	Front Under Cover		1	
10	641300560	USB Cover		1	
11	641300250	Rubber Plate		5	
12	774015503	CIS Power Board		1	
13	774015535	Switching Power Supply Board	BWC24SX-U	1	
14	363028182	Rubber Foot	C30RK28UL	2	
15	363030192	Rubber Foot	C30RK30UL	3	
16	774015502	Data Power Board		1	
17	361504001	Cable Stopper	SG-130-V0	5	
18	393010160	Spacer	ABS-2016	1	
19	774015505	IEEE 1394a Board		1	

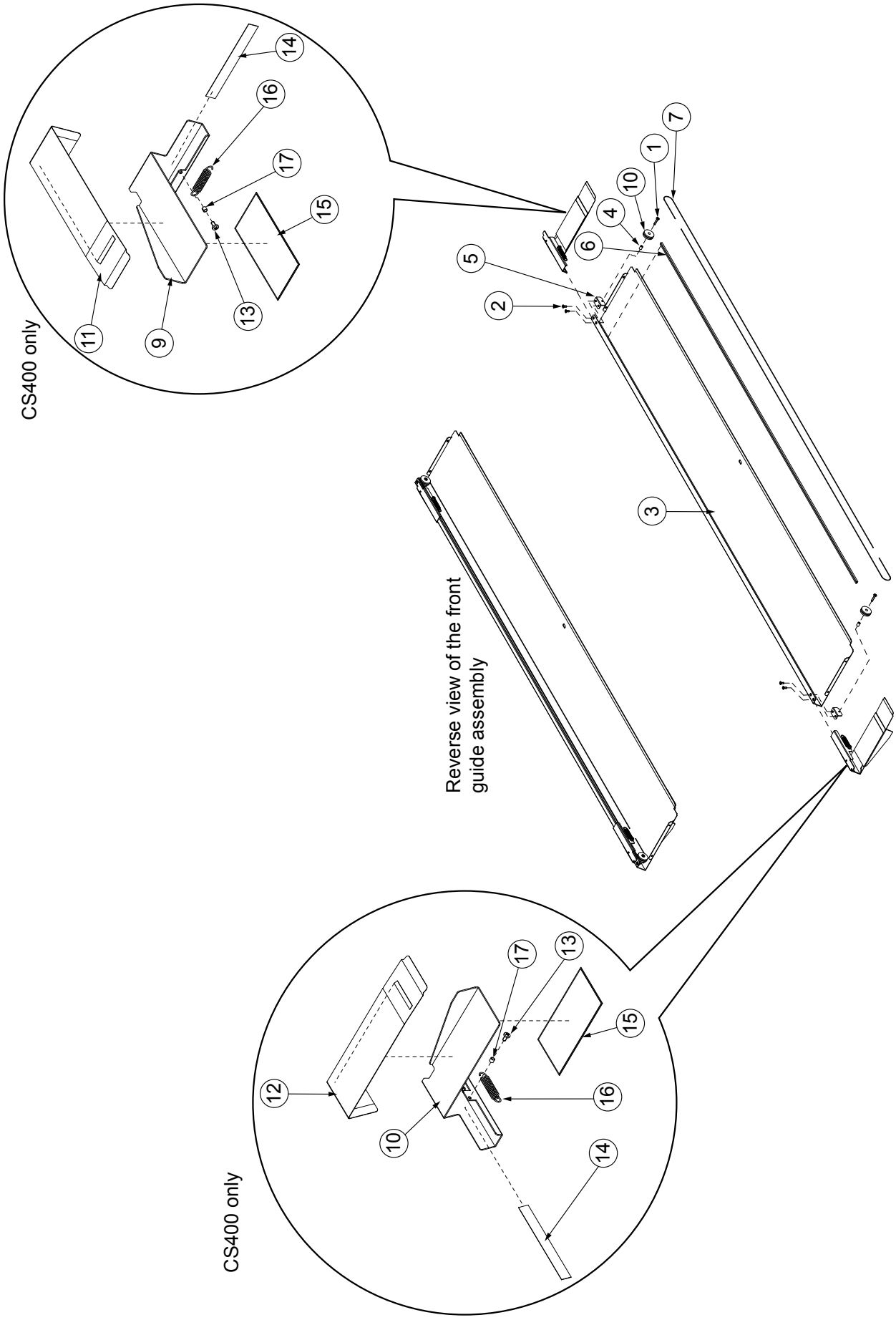
Main Frame


1
10
6
15
3
14
11 ×2
9
5
19
19
4
17
15
12
14
8
13
15
2
7
16
11
Center Cover Assembly
(See Section 14.6)
Drive Roller Assembly
(See Section 14.4)
Front Guide Assembly (See Section 14.2)

14.3 Front Guide

No.	Part No.	Part name	Description	Q'ty	Remarks
1	480003161	M3L16 Binding Head Screw		2	CS400-10
2	480033081	M3L8 Flat Head Screw		4	CS400-10
3	641300050	Front Guide CS400-10		1	CS400-10
	641400050	Front Guide CS300-10		1	CS300-10
4	774016500	Collar 5-7.5		2	CS400-10
5	641301200	Pulley Bracket		2	CS400-10
6	361204001	Edging Plate		1	CS400-10
7	641300290	Wire		1	CS400-10
8	350195011	Pulley	VDC-277/57	2	CS400-10
9	641300200	Right Guide		1	CS400-10
10	641300210	Left Guide		1	CS400-10
11	641300220	Sheet A		1	CS400-10
12	641301230	Sheet B		1	CS400-10
13	480003061	M3L6 Binding Head Screw		2	CS400-10
14	641300390	Felt 10		2	CS400-10
15	641300380	Felt 100		2	CS400-10
16	360600661	Spring E661		2	CS400-10
17	392060070	Collar 3L3.5		2	CS400-10

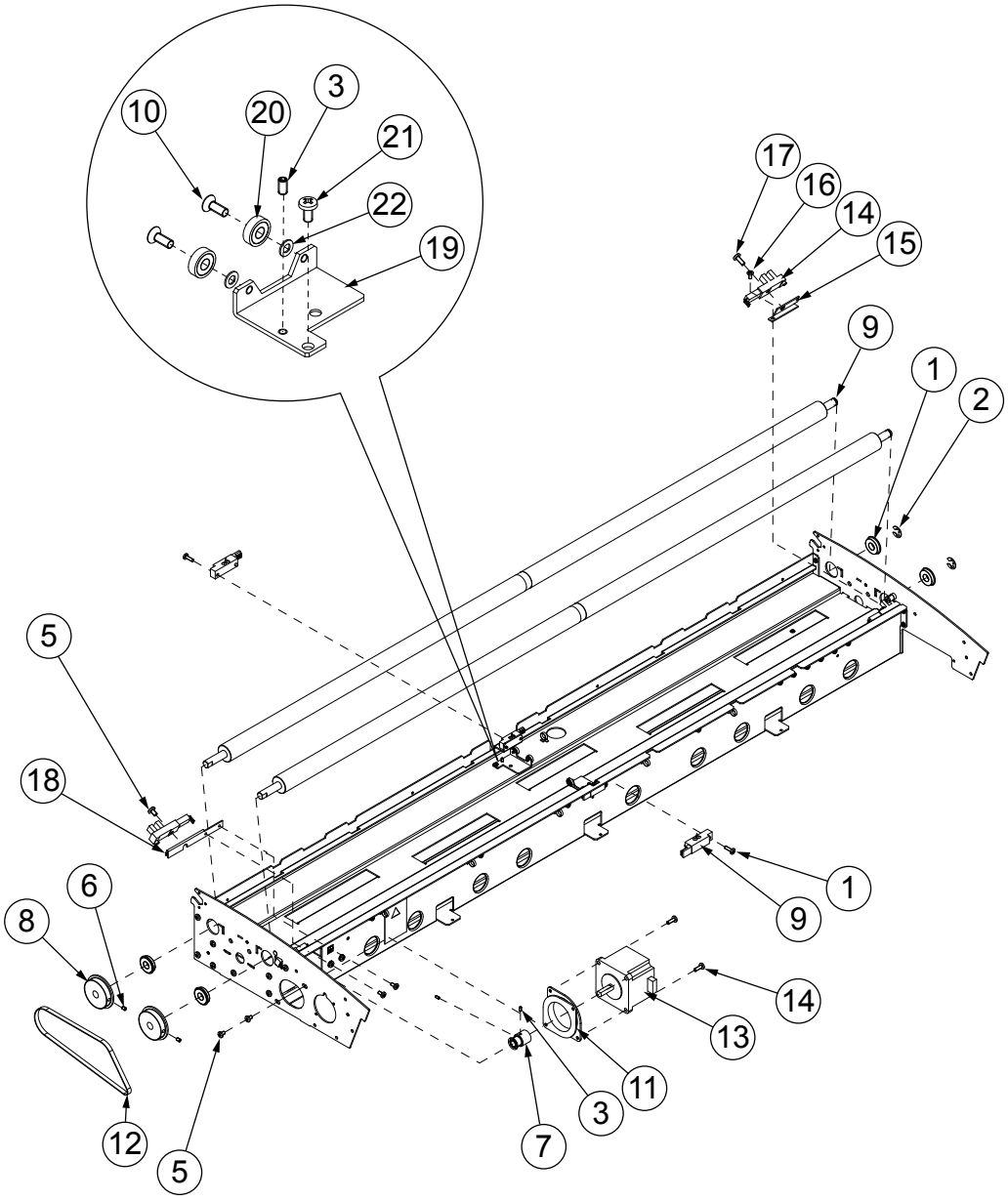
Front Guide


CS400 only
Reverse view of the front guide assembly
CS400 only

14.4 Drive Roller

No.	Part No.	Part name	Description	Q'ty	Remarks
1	314690020	Bearing	6900ZZNXR	4	
2	331608019	E-ring C8		2	
3	481003063	M3L6 WP Set Screw		2	
4	480004121	M4L12 Binding Head Screw		2	
5	480004061	M4L6 Binding Head Screw		2	
6	481004063	M4L6 WP Set Screw		2	
7	641300170	Pulley	Pulley 22Z	1	
8	641300180	Pulley	Pulley 66Z	2	
9	641300130	Drive Roller 43		2	
10	480033081	M3L8 Flat Head Screw		1	
11	308004002	Motor Mount	RF2600-A5	1	
12	378020021	Belt	S2M-400	1	
13	500051794	Motor	KT60M06-551	1	
14	500051897	Cover Sensor	TLP1201A	2	
15	641300280	Right Cover Sensor Bracket		1	
16	480003061	M3L6 Binding Head Screw		3	
17	480004101	M4L10 Binding Head Screw		1	
18	641300260	Left Cover Sensor Bracket		1	
19	641300190	Roller Holder Bracket		1	
20	309011003	Roller Bearing	10SRF41Z	2	
21	480003061	M3L6 Binding Head Screw		1	
22	484003001	Washer C3		2	

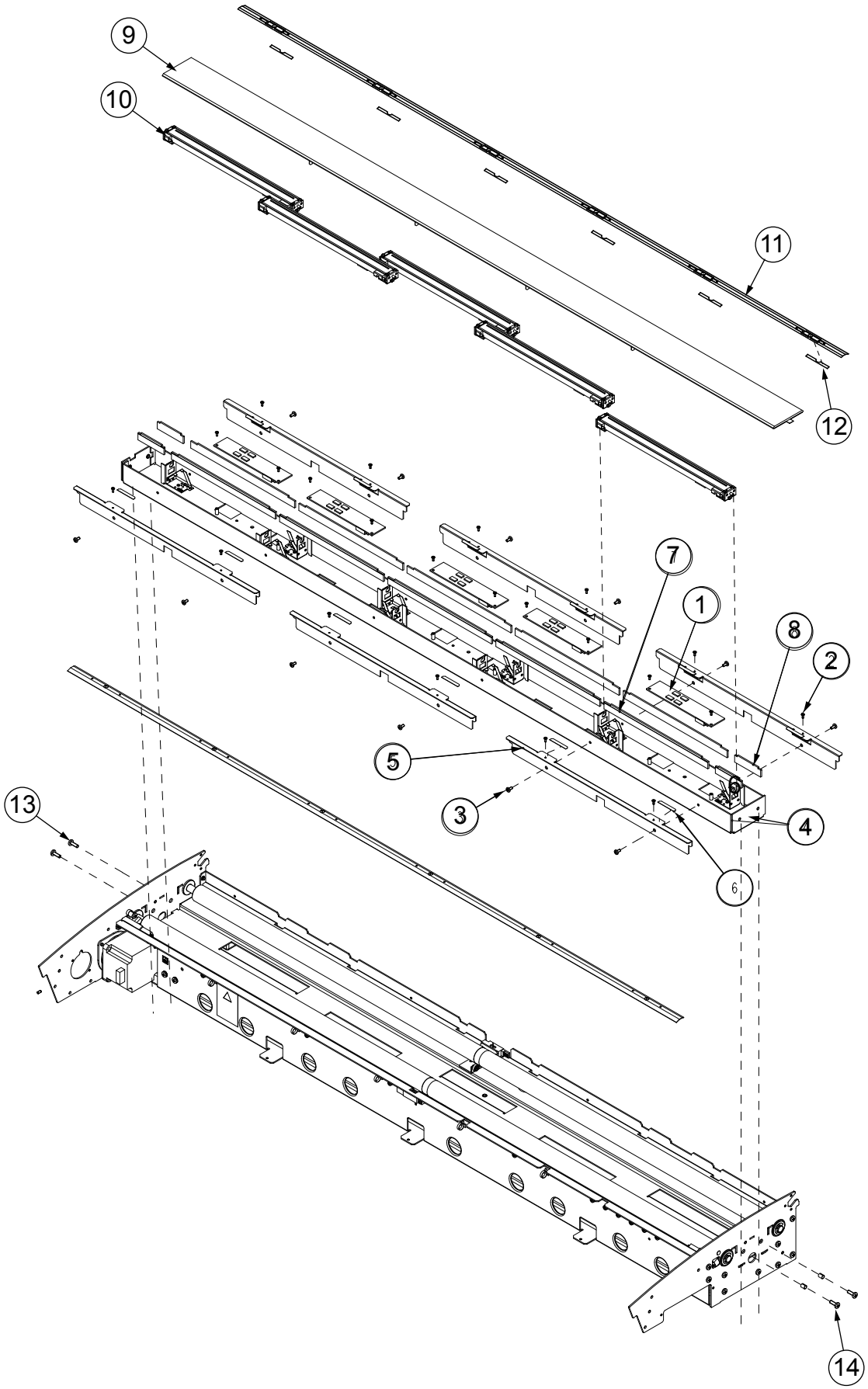
Drive Roller



14.5 CIS Unit

No.	Part No.	Part name	Description	Q'ty	Remarks
1	774015501	CIS Controller Board		5	
2	480002051	M2L5 Binding Head Screw		22	
3	480003061	M3L6 Binding Head Screw		12	
4	641300400	Unit Base 43		1	
5	641300400	Glass Guide Plate		6	
6	641300440	Glass Guide Rubber		12	
7	641300680	Rubber Sponge 1		10	
8	641300690	Rubber Sponge 2		4	
9	774015027	Glass 43 Assembly		1	
10	774015026	CIS Sensor Assembly		5	
11	641300531	Glass Holding Plate		2	
12	641300550	Glass Rubber Stopper		12	
13	480004121	M4L12 Binding Head Screw		4	
14	392060070	Collar 4L6.5		2	

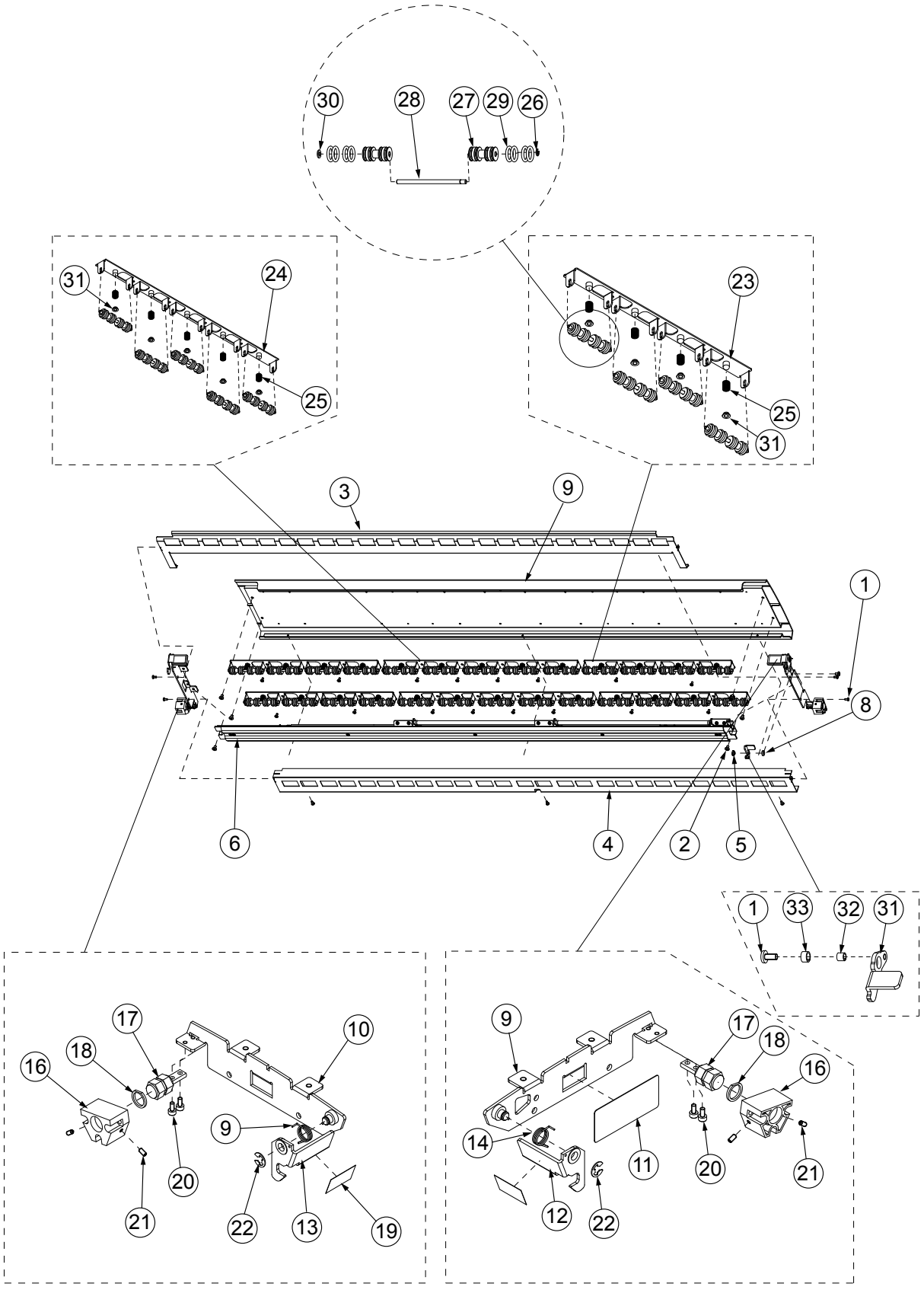
CIS Unit



14.6 Center Cover

No.	Part No.	Part name	Description	Q'ty	Remarks
1	480003061	M3L6 Binding Head Screw		23	
2	480004061	M4L6 Binding Head Screw		7	
3	641300360	Front Pinch Roller Cover		1	
4	641300370	Rear Pinch Roller Cover		1	
5	641301060	Cam Shaft		1	
6	774015023	Paper Hold-down Assembly		1	
7	641300010	Center Cover 43		1	
8	394000010	Spacer	CC-0410-20	1	
9	641300230	Center Cover Right Plate		1	
10	641300240	Center Cover Left Plate		1	
11	641300650	Label HI-LOW		1	
12	641300300	Latch Right Assembly		12	
13	641300310	Latch Left Assembly		4	
14	641300320	Spring Right Latch		1	
15	641300330	Spring Left Latch		1	
16	631230071	Hinge Block		2	
17	305703007	Hexagon Torque Shaft		2	
18	641300340	Collar Hinge		2	
19	641300640	Label Push		2	
20	480063143	M3L6 Cap Screw		4	
21	481003063	M3L6 WP Set Screw		4	
22	331608019	E-ring C5		2	
23	641300120	Roller Bar 4B Assembly		4	
24	641300350	Roller Bar 5B Assembly		2	
25	379000168	Coil Spring	A085-02	26	
26	330703006	E-ring C3		26	
27	641300100	Pinch Roller G		52	
28	641300110	Pinch Roller Shaft		26	
29	341511001	O-ring	1AP12	208	
30	484004001	Washer C4		26	
31	324050311	Oilless Bearing 80F-0503		26	

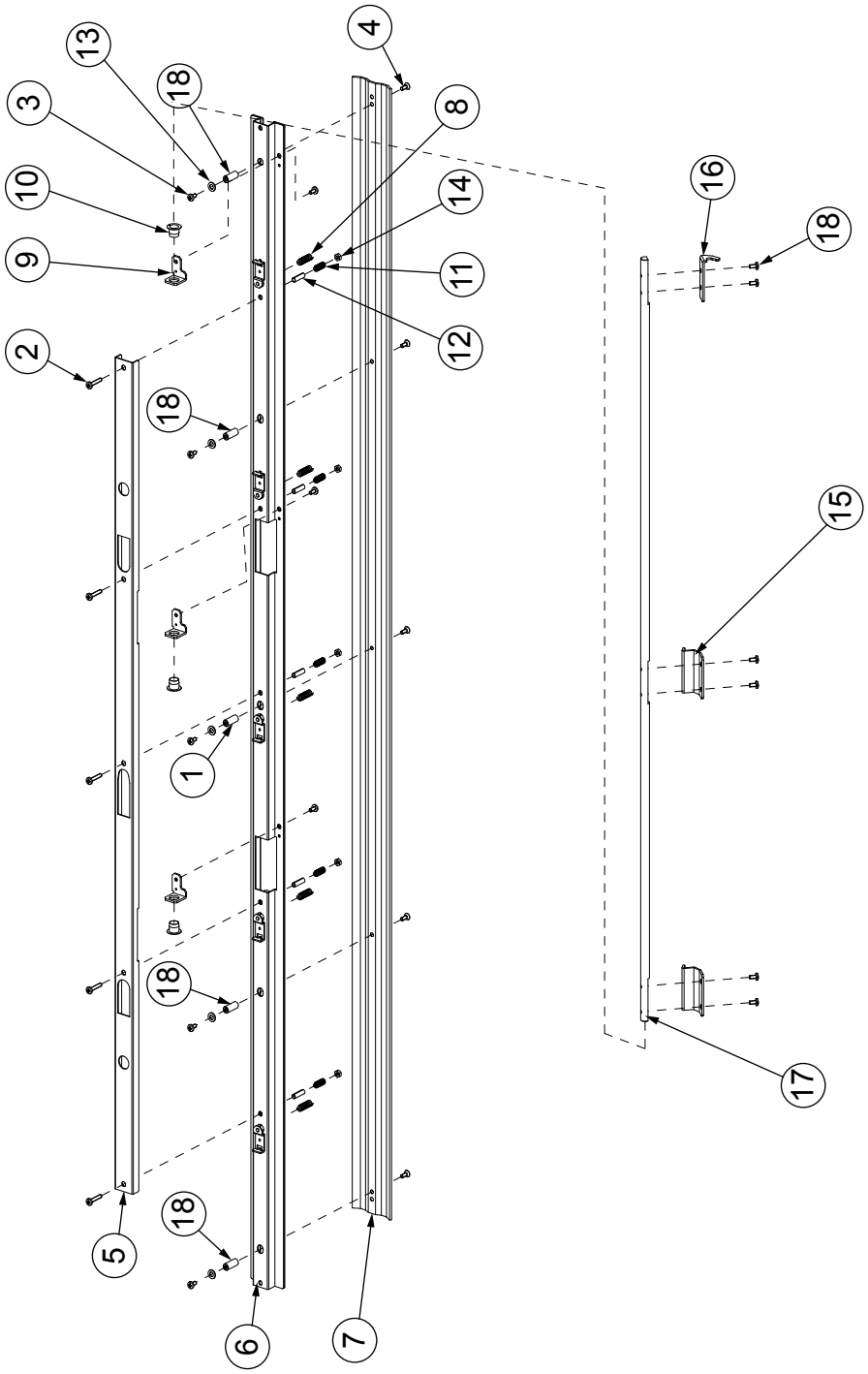
Center Cover



14.7 Hold-down Unit

No.	Part No.	Part name	Description	Q'ty	Remarks
1	393730150	Spacer	AR-316	1	
2	480003161	M3L16 Binding Head Screw		5	
3	480003061	M3L6 Binding Head Screw		9	
4	480033081	M3L8 Flat Head Screw		5	
5	641301010	Hold-down Weight		1	
6	641301000	Paper Hold-down Base		1	
7	641000663	Paper Hold-down Plate	CS-JEC	1	
8	641000470	Spring C-124G		5	
9	641301020	Cam Shaft Holder		3	
10	308004007	Collar HPF-0808		3	
11	302200141	Spring C-152		5	
12	392060070	Collar 3L14		5	
13	484004001	Washer C4		5	
14	483013011	M3 Nut		5	
15	641301040	Action Plate		2	
16	641301051	Cam 1		1	
17	641301030	Cam Shaft		1	
18	641301150	Collar 5-16		4	

Hold-down Unit



14.8 Cables

No.	Part No.	Part name	Description	Q'ty	Remarks
1	694500792	3SB-2C-2B	DCB to DPB	1	
2	694500833	3SB-2C-6C	DCB to MD3P	1	
3	694500841	3SB-2C-7A	Switching Power Supply	1	
4	694500921	3SB-2C-15A	DPB to CPB Power Supply	1	
5	694500901	3SB-2C-13A	Low Consumption Power Supply	1	
6	694450110	FPC Cable CS20	CIS Flexible Cable	1	
7	694500784	3SB-2C-1D	CIS Board Power Supply	5	
8	694500864	3SB-2C-9D	CIS Board to DCB Cable (J20)	1	
9	694500942	3SB-2C-17B	CIS Board to DCB Cable (J21)	1	
10	694500952	3SB-2C-18B	CIS Board to DCB Cable (J22)	1	
11	694500962	3SB-2C-19B	CIS Board to DCB Cable (J23)	1	
12	694500972	3SB-2C-20B	CIS Board to DCB Cable (J24)	1	
13	694500910	3SB-2C-14	Control Panel Relay Cable	1	

14.9 Other Parts

Standard Accessories

No.	Part No.	Part name	Description	Q'ty	Remarks
1	640310450	Document Guide Wire		3	
2	641200270	Document Guide 20		2	CS300-10
3	641300791	CS400-UM-152	Manual	1	
4	641200201	Calibration Sheet Assembly	Shade Assy-RMD	1	
5	641300724	CS400-CDM04M	CD-ROM	1	
6	641001850	IS0907	Carrier Sheet (A0)	1	

Stand Assembly

No.	Part No.	Part name	Description	Q'ty	Remarks
1	641300801	Stand Assembly		1	
2	641300811	Center Bar		1	
3	641300822	Top Plate		2	
4	641300835	Post		2	
5	641300850	Foot		2	
6	619001060	End Cap		4	
7	641300860	Frame A		3	
8	301112009	Caster		4	
9	390914101	M4L10 Coin Screw		4	
10	480165161	M5L16 Flange Socket		12	
11	480035161	M5L16 Flat Head Screw		8	
12		M5 Shoulder Screw		4	
13		M5 Wrench		1	
14		M3L9 Self Tapping Screw		4	
15	641300881	Basket Cloth			

Box

No.	Part No.	Part name	Description	Q'ty	Remarks
1	641300900	CS400/300 Box Assembly		1	